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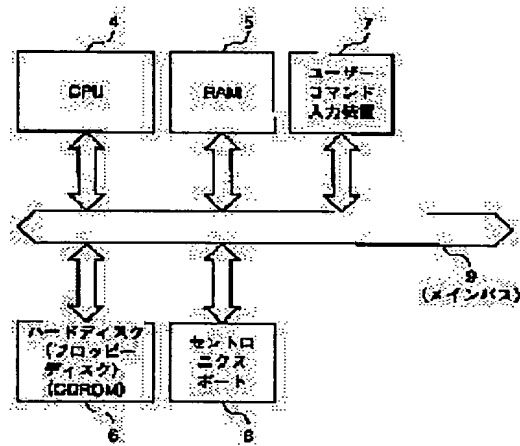
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(54) PRINTING SYSTEM AND PRINTING CONTROL METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To eliminate useless printing and to dissolve the waste of paper and toner by immediately interrupting or stopping a printing processing when an operator instructs the interruption or stoppage of printing.

SOLUTION: A personal computer is provided with a user command input device 7 for inputting a command for instructing the interruption/restart of the printing processing and the cancellation of printing data to a laser printer and a centronics port 8 for immediately transmitting an input command to the printer. Then, the laser printer is provided with a CPU for completing the printing processing of a pertinent page during printing processing execution and interrupting the printing processing of the next page when a received command is an interruption command, restarting the printing processing during the interruption in the case of a restart command and cancelling all the unprinted printing data inside the printer in the case of a cancellation command.



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CLAIMS

[Claim(s)]

[Claim 1] In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page An input means for said host computer to input the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer, A transmitting means to transmit immediately the command inputted through this input means to said printer is provided. Said printer A distinction means to distinguish the class of command received from said host computer, When a receiving command is distinguished from an interruption directive command by this distinction means, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in the printer concerned are canceled. The printing system characterized by providing the control means with which a new printing instruction is equipped.

[Claim 2] It is the printing system characterized by transmitting said transmitting means in said printing system according to claim 1 using an electromagnetic wave.

[Claim 3] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means through lines other than the line used for the usual printing data transfer between said host computers and said printers.

[Claim 4] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[Claim 5] It is the printing system which sets to said printing system according to claim 1, and is characterized by for said transmitting means setting up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and transmitting said command on said logical channel.

[Claim 6] Said printer is a printing system characterized by having the function which can receive said command from said host computer even when printing data storage is in a full condition in said printing system according to claim 1.

[Claim 7] In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer, The stroke which transmits the inputted command to said printer immediately, and the stroke from which said printer distinguishes the class of command received from said host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, The printing control approach characterized by having the stroke which makes the printing processing under interruption when

a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command.

[Claim 8] It is the printing control approach characterized by the stroke immediately transmitted to said printer performing said inputted command in said printing control approach according to claim 7 using an electromagnetic wave.

[Claim 9] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out through lines other than the line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 10] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[Claim 11] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 12] The printing control approach characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7 even when the printing data storage of said printer is in a full condition.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a printing system and the printing control approach, and when canceling the futility of a form or a toner by losing useless printing especially, it relates to a suitable printing system and the printing control approach.

[0002]

[Description of the Prior Art] Conventionally, there is a printing system equipped with the printer which prints and outputs the printing data which received printing data from the host computer which can be transmitted to a printer, and the host computer concerned for every page. In this kind of printing system, although printing data will not be sent out from a host computer after printing interruption directions to a printer if an operator inputs printing interruption directions from the keyboard of a host computer etc., the printout of the printing data which the printer has already received from the host computer is carried out from a printer before printing interruption directions.

[0003]

[Problem(s) to be Solved by the Invention] However, in the conventional printing system, as mentioned above, when an operator performed printing interruption directions from a host computer, printing data [finishing / a printer / reception / from a host computer already] had the problem that a printout was carried out, before printing interruption directions. When having put in another way and the conventional printing system inputted interruption of printing of an operator, or directions of a termination into a host computer, while transmitting directions of an operator to the printer immediately from the host computer, when the printer received directions of printing interruption or a printing termination, processing which a paper jam does not generate immediately was performed and the function to in_which printing processing is interrupted or stopped did not have. Therefore, in the conventional printing system, useless printing was performed, consequently there was nonconformity that the futility of a form or a toner occurred.

[0004] When this invention is made in view of the point mentioned above and an operator directs interruption or a termination of printing, it aims at offering the printing system and the printing control approach which made it possible to lose useless printing and to cancel the futility of a form or a toner etc. by interrupting or stopping printing processing immediately.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned object, invention of claim 1 In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page An input means for said host computer to input the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer, A transmitting means to transmit immediately the command inputted through this input means to said printer is provided. Said printer A distinction means to distinguish the class of command received from said host computer, When a receiving command is distinguished from an interruption directive command by this distinction means, while making printing processing of the applicable page under printing processing activation complete When the

printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in the printer concerned are canceled. It is characterized by providing the control means with which a new printing instruction is equipped.

[0006] In order to attain the above-mentioned object, invention of claim 2 is characterized by transmitting said transmitting means using an electromagnetic wave in said printing system according to claim 1.

[0007] In order to attain the above-mentioned object, invention of claim 3 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting through lines other than the line used for the usual printing data transfer between said host computers and said printers.

[0008] In order to attain the above-mentioned object, invention of claim 4 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[0009] In order to attain the above-mentioned object, it sets to said printing system according to claim 1, said transmitting means sets up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and invention of claim 5 is characterized by transmitting said command on said logical channel.

[0010] In order to attain the above-mentioned object, it is characterized by invention of claim 6 having the function which said printer can receive [of said host computer to said command] even when printing data storage is in a full condition in said printing system according to claim 1.

[0011] In order to attain the above-mentioned object, invention of claim 7 In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer, The stroke which transmits the inputted command to said printer immediately, and the stroke from which said printer distinguishes the class of command received from said host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, It is characterized by having the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command.

[0012] In order to attain the above-mentioned object, the stroke in which invention of claim 8 transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is characterized by carrying out using an electromagnetic wave.

[0013] In order to attain the above-mentioned object, invention of claim 9 is characterized by performing the stroke which transmits said inputted command to said printer immediately through lines other than the line used for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.

[0014] In order to attain the above-mentioned object, invention of claim 10 is characterized by performing the stroke which transmits said inputted command to said printer immediately using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.

[0015] In order to attain the above-mentioned object, invention of claim 11 is characterized by the stroke which transmits said inputted command to said printer immediately transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said

printers in said printing control approach according to claim 7.

[0016] In order to attain the above-mentioned object, invention of claim 12 is characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7, even when the printing data storage of said printer is in a full condition.

[0017]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

[0018] (1) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 1st operation and the 1st operation is explained based on drawing 3, this printing system has composition equipped with the personal computer 1 as a host computer, and the laser beam printer 3 as a printer connected to this personal computer 1 through the Centronics line 2 (path cord corresponding to [for printers] a 24-bit parallel interface).

[0019] In addition, although the laser beam printer is raised with the gestalt of the gestalt of the 1st operation and the 2nd thru/or the 4th operation mentioned later to the example as a printer, it is possible to use the printer by the method of the arbitration of a non impact type (an electrophotography type, a hot printing type, a sensible-heat type, an ink jet type, an electrostatic type, discharge-breakdown type) or the impact types (dot impact type) as a printer.

[0020] Next, if the internal configuration of the personal computer 1 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 1, the personal computer 1 has composition equipped with CPU (central processing unit)4, RAM (at-any-time write-in read-out memory)5, a hard disk 6, the user command input device 7, the Centronics port 8, and Maine Bath 9.

[0021] If the configuration of each part of the above is explained in full detail, CPU4 will control each part of a personal computer based on a program. RAM5 is used as a work area. A hard disk 6 may store a program and a floppy disk, CDROM (Compact Disc ROM), MO, etc. may be used for it instead of a hard disk 6. The user command input unit 7 is for an operator to input commands, such as printing demand instruction / printing stop instruction, a printing termination order, and a resumption instruction of printing, and specifically consists of a mouse, a keyboard, etc. The Centronics port 8 outputs an instruction, a control channel initiation recognition signal, control channel termination printing data, various recognition signals, etc. to a laser beam printer 3 through the Centronics line 2. Maine Bath 9 is a common signalling channel.

[0022] Moreover, if the internal configuration of the laser beam printer 3 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 2, the laser beam printer 3 has composition equipped with CPU10, RAM11 and ROM12, the Centronics port 13, the paper transport device 14, imprint equipment 15, and Maine Bath 16.

[0023] If the configuration of each part of the above is explained in full detail, CPU10 will control each part of a laser beam printer based on a program. RAM11 is used as a work area. ROM12 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM12. The Centronics port 13 incorporates an instruction, a control channel initiation recognition signal, control channel termination printing data, various recognition signals, etc. from the Centronics line 2. The paper transport device 14 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 15 controls the device in which printing actuation is performed to a print form. Maine Bath 16 is a common signalling channel.

[0024] In addition, especially with the gestalt of the 1st operation, unless it refuses, CPU4 controls RAM5, a hard disk 6, the user command input unit 7, and the Centronics port 8 by the personal computer 1 through Maine Bath 9, and CPU10 controls RAM11, ROM12, the Centronics port 13, the paper transport device 14, and imprint equipment 15 by the laser beam printer 3 through Maine Bath 15.

[0025] With the gestalt of the 1st operation, two logical channels are set up on the Centronics line 2 which connects a personal computer 1 and a laser beam printer 3, and drawing 4 is the schematic diagram showing the example. The control signal of a personal computer 1 is sent out through logical channel distribution equipment 17 to the logical channel C1 for control signal

transmission of the Centronics line 2, and is memorized by the 1st memory 19 through the logical channel judging equipment 18 of a laser beam printer 3. Moreover, the printing data of a personal computer 1 are sent out through logical channel distribution equipment 17 to the logical channel C2 for data transmission of the Centronics line 2, and are memorized by the 2nd memory 20 through the logical channel judging equipment 18 of a laser beam printer 3.

[0026] Moreover, in the gestalt of the 1st operation, the program by the side of a personal computer 1 is divided into the printing data forwarding section program and the user interrupt processing section program. Fundamentally, the send state FLG (flag) which exists on RAM5 of a personal computer 1 is rewritten, when a user interrupt processing section program receives the interruption processing from an operator, and a printing data forwarding section program performs various processings with reference to it.

[0027] Next, said printing data forwarding section program is explained based on drawing 5. An operator creates data to print using application, after starting a printing system (step S101) (step S102). In addition, explanation is omitted in order for there to be nothing relation with the essence of this invention about the printing data origination approach. If an operator does the depression of the printing demand carbon button with which the user command input device 7 of a personal computer 1 is equipped (step S103), a printer driver will start creation of the printing data corresponding to the laser beam printer 3 which performs printing based on the printing data from application (step S104). A printer driver's termination of creation of printing data transmits printing data to printer Supra which transmits data to a laser beam printer 3 (step S106). (step S105)

[0028] Printer Supra starts transmission for the printing data of 1 byte of head from the Centronics port 8 to a laser beam printer 3 among the received printing data using the protocol of Centronics (step S107). Printer Supra sets the send state FLG which exists on RAM5 as CONTINUE (step S108). It judges that all transmission of printing data was completed when there were no printing data which should investigate whether printer Supra has printing data which should still be transmitted (step S110), and should be transmitted, a send state FLG is set to WAIT here (step S123), and this processing is ended (step S124).

[0029] On the other hand, printer Supra investigates a send state FLG, when there are non-sent out data (step S111), and when a send state FLG is CONTINUE Continue return printing data transmission to the above-mentioned step S109, and when a send state FLG is not CONTINUE It is recognized as printing stop instruction by the operator having been published, and a control channel initiation recognition signal is outputted from the Centronics port 8 to a laser beam printer 3 (step S112), and printing stop instruction is continuously outputted from the Centronics port 8 (step S113).

[0030] In addition, a control channel initiation recognition signal is 1 byte of signal, and the signal about a control-related logical channel will be transmitted until it transmits a control channel termination recognition signal after this. Moreover, the same value as 1 byte of this control channel initiation recognition signal shall not exist in printing data. When the same value as a control channel initiation recognition signal comes out by image data etc., a dummy bit is inserted in the creation time of printing data, and discernment processing of distinguishing from a control channel initiation recognition signal is performed.

[0031] Printer Supra investigates whether a send state FLG is DISCARD (step S114), when a send state FLG is DISCARD, it recognizes it as the printing termination order by the operator having been published, outputs a printing data RESET instruction from the Centronics port 8 to a laser beam printer 3 (step S120), and outputs a control channel termination recognition signal from the Centronics port 8 following it (step S121). Then, printer Supra cancels the printing data which are not sent [which is carrying out current maintenance] out (step S122), sets a send state FLG to WAIT (step S123), and ends this processing (step S124).

[0032] On the other hand, printer Supra stands by a new instruction of fixed time amount and an operator, when a send state FLG is not DISCARD (step S115). After fixed time amount, when a send state FLG is STOP, the answer of the (step S116 judges that there were not affirmation) and a user instruction input, and processes step S114 again. When a send state FLG is not STOP, the answer of the (step S116 investigates whether negative) and a send state FLG are

CONTINUE(s) (step S117).

[0033] When a send state FLG is CONTINUE, printer Supra judges that there was a resumption instruction of printing from an operator, sends out the resumption instruction of printing to a laser beam printer 3 (step S118), sends out a control channel termination recognition signal continuously (step S119), and resumes return printing data forwarding processing to the above-mentioned step S109. When a send state FLG is not CONTINUE, it is recognized as the abnormalities in the status (operating state) having occurred, and shifts to the above-mentioned step S120.

[0034] Next, actuation of the interruption processing by the side of a personal computer 1 (host computer) is explained to a detail based on drawing 6. It is inputted from the user command input device 7 (a keyboard or mouse), and the trigger of interruption from an operator is notified to the corresponding interrupt handler. In addition, the instruction about the gestalt of this operation which an operator can notify is three, printing interruption, resumption of printing, and a printing termination.

[0035] If the interrupt by the operator occurs with the user command input unit 7 (step S201), the interruption factor is acquired (step S202), and it stores on RAM5. subsequently, the case where a send state FLG is not WAIT with reference to the send state FLG on current RAM5 (step S203) — (— the answer of step S203 judged it as under printing data transmission (it contains also during interruption), and negative) and current printer Supra acquired at the above-mentioned step S202 — it interrupts and a factor is referred to.

[0036] When an interruption factor is printing interruption, the answer of the (step S204 sets affirmation) and a send state FLG as STOP (step S208), and ends this processing (step S219). When an interruption factor is resumption of printing, the answer of the (step S205 sets affirmation) and a send state FLG as CONTINUE (step S209), and ends this processing (step S214). When an interruption factor is a printing termination, the answer of the (step S206 sets affirmation) and a send state FLG as DISCARD (step S210), and ends this processing (step S219).

[0037] When a send state FLG is WAIT, it judges that the answer of the (step S203 has completed all printing data transmission by affirmation) and printer Supra, and the interrupt handler itself transmits control instruction to a laser beam printer 3. Then, a control channel initiation recognition signal is transmitted through the Centronics port 8 to a laser beam printer 3 (step S207), and the interruption factor acquired at the above-mentioned step S202 is referred to.

[0038] When an interruption factor is printing interruption, the answer of the (step S211 sends out printing stop instruction to affirmation) and a laser beam printer 3 (step S214), and performs step S218. When an interruption factor is resumption of printing, the answer of the (step S212 sends out the resumption instruction of printing to affirmation) and a laser beam printer 3 (step S215), and performs step S218. When an interruption factor is a printing termination, printing stop instruction is sent out to (step S213) and a laser beam printer 3 (step S216), a printing data RESET instruction is sent out continuously (step S217), and step S218 is performed. At step S218, a control channel termination recognition signal is sent out to a laser beam printer 3, and this processing is ended (step S219).

[0039] Next, actuation of the program of Maine by the side of a laser beam printer 3 (printer) is explained based on drawing 7. In a laser beam printer 3 side, printing processings (printing control, rasterizing, paper transfer control, etc.) are performed by the program of Maine, and an interrupt handler performs data reception from a personal computer 1 through the Centronics port 13. It opts for the processing which a main program should perform with reference to the printing status fundamentally. Moreover, an interrupt handler notifies the instruction received from the personal computer 1 to a main program by updating the printing status.

[0040] If a power source is switched on (step S301), a laser beam printer 3 will start processing, will initialize the laser beam printer concerned itself (step S302), and will set the printing status on RAM11 as printing activation (step S303). Subsequently, it investigates whether the printing data which should be printed in the 2nd memory 20 (refer to drawing 4) which is a printing data storage field on RAM11 are stored (step S304). When there are no data which should be printed,

step S304 is performed again.

[0041] When there are data which should be printed, the printing status on RAM11 investigates whether it is printing activation (step S305). When the printing status is printing activation, printing processing of a page in which a degree should be printed is performed (step S306). And when the delivery of the paper which the page concerned printed is completed normally, the printing data on the 2nd memory 20 on (step S307) and RAM11 which ended printing processing are deleted (step S308), and step S304 is performed again.

[0042] In the above-mentioned step S305, when the printing status is not printing activation, it investigates whether the printing status is printing reset (step S309). When the printing status is printing reset, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled (step S310). And after initializing a laser beam printer 3 (step S311) and completing initialization, the printing status is set as activation (step S312), and step S304 is performed again.

[0043] In the above-mentioned step S309, when the printing status is not printing reset, the printing status investigates whether it is printing interruption (step S313). When the printing status is printing interruption, step S305 is performed that the following user command should be acquired. When the printing status is not printing interruption, it judges that the status is unusual, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled, and a laser beam printer 3 is initialized (step S314). After initialization is completed, the printing status is set as activation (step S315), and step S304 is performed again.

[0044] Next, actuation of the interrupt handler of a laser beam printer 3 (printer) is explained based on drawing 8. An interrupt handler is started at the time of completion of initialization of a laser beam printer 3 (step S401), and stands by interruption from a personal computer 1 (host computer) (step S402). Generating of interruption investigates whether nSTROB of the Centronics line 2 was turned off through the Centronics port 13 (step S403).

[0045] When not turned off, processing corresponding to each interruption is performed (step S405). When turned off, BUSY of the Centronics line 2 is set to HIGH through the Centronics port 13 (step S404), the further interruption from a personal computer 1 is refused, and data are incorporated from the DATA line of the Centronics line 2 through the Centronics port 13 (step S406). And the data concerned judge whether it is data of a control channel (step S407). In this case, it judges by whether it is data of the section when data were sandwiched by the control channel initiation identifier and the termination identifier.

[0046] When the incorporated data are not data of a control channel, it is judged as the usual printing data and stores in the 2nd memory 20 on RAM11 (step S408). And it investigates whether there is any opening which can still store printing data in the 2nd memory 20 (step S409). When there is no opening in the 2nd memory 20, fixed time amount standby is carried out and step S409 is performed again. When an opening is in the 2nd memory 20, BUSY of the Centronics line 2 is set to LOW (step S410), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13 (step S411), 1 byte of data reception completion is notified, and step S402 is performed again that the following data should be received.

[0047] On the other hand, when the incorporated data are data of a control channel, it is judged as the data of control instruction and stores in the 1st memory 19 (refer to drawing 4) on RAM11 (step S412). And it investigates whether there is any opening which can still store control instruction data in the 1st memory 19 (step S413). When there is no opening in the 1st memory 19, fixed time amount standby is carried out and step S413 is performed again. When an opening is in the 1st memory 19, BUSY of the Centronics line 2 is set to LOW (step S414), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13, and 1 byte of data reception completion is notified (step S415).

[0048] It investigates whether the control instruction stored in the 1st memory 19 is printing stop instruction after advice of data reception completion (step S416). When control instruction is printing stop instruction, the printing status is set as printing interruption that it should notify

to Maine (step S417), the printing stop instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.

[0049] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not printing stop instruction, it investigates whether the control instruction stored in the 1st memory 19 is a printing RESET instruction (step S418). When control instruction is a printing RESET instruction, the printing status is set as Printing RESET that it should notify to Maine (step S419), the printing RESET instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.

[0050] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a printing RESET instruction, it investigates whether the control instruction stored in the 1st memory 19 is a resumption instruction of printing (step S420). When control instruction is a resumption instruction of printing, the printing status is set as resumption of printing that it should notify to Maine (step S421), the resumption instruction of printing of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.

[0051] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a resumption instruction of printing, it is recognized as the abnormalities in the status having occurred, the printing status is set as Printing RESET (step S422), and step S402 is performed after setting-out termination.

[0052] As mentioned above, since the operator of a printing system can interrupt or stop printing processing of a laser beam printer 3 immediately when he directs interruption or a termination of printing to a laser beam printer 3 through the user command input unit 7 of a personal computer 1, while not performing useless printing and being able to cancel the futility of a form or a toner, according to the gestalt of the 1st operation, release of a laser beam printer 3 also becomes possible immediately. Moreover, a personal computer 1 and a laser beam printer 3 have the advantage that it is not necessary to add new hardware, by adopting the approach by the gestalt of the 1st operation. Moreover, it is possible to also realize port setting out of the hardware to be used in the conventional state.

[0053] (2) Replace the gestalt of operation of the gestalt 2nd of the 2nd operation with the approach of sending out control command in the gestalt of implementation of the above 1st using the data line of the Centronics line 2, and it notifies printing stop instruction, the resumption instruction of printing, and a printing termination order to a laser beam printer 3 using the intact BIT number (5-7) of the control line of the Centronics line 2. Since it is the same as that of each bit control approach in nSTROB of the Centronics line 2 etc., the control approach of the control lines 5-BIT 7 is omitted for details.

[0054] Drawing 9 is drawing showing two examples of a definition of the control instruction of the control cutting tool of the Centronics control. Example 1 — a printing interruption instruction — in ON and the resumption instruction of printing, ON and a printing termination order set [BIT5] BIT7 to ON for BIT6. moreover — Example 2 — a printing interruption instruction — ON and a printing termination order carry out [BIT /5 / instruction / OFF (when BIT5 is always turned off during interruption and it is turned on, unless a laser beam printer 3 has a printing termination order, it is recognized as interruption instruction discharge), and / of printing / resumption] BIT6 as ON in BIT5. In addition, a printing termination order also has the approach for which nINIT of a control line is substituted.

[0055] The signal of a pulse condition is sent out by setting the control signal sending-out approach of each instruction for a laser beam printer 3 to HIGH from a personal computer 1 to each bit (DEFAULT level OFF) in the gestalt of the 2nd operation, and carrying out after [OFF] fixed time amount. Since the detail of the system configuration concerning the gestalt of the 2nd operation, an internal-block configuration, and actuation is almost the same as the gestalt of implementation of the above 1st, only a difference is explained below.

[0056] With the gestalt of the 2nd operation, since there is no need of setting up a logical channel in order to use a control line, sending-out becomes unnecessary about a control channel termination identifier to sending-out and "laser beam printer to "laser beam printer of operation applied to steps S112, S119, and S122 of drawing 5 R> 5, and steps S207 and S218 of drawing 6 among the actuation in a personal computer 1 in a control channel initiation identifier.

[0057] Moreover, with the gestalt of the 2nd operation, in a laser beam printer 3 side, when it interrupts, the controller is monitoring the condition of the control lines 5-BIT 7 continuously and the condition of a signal line has change, it is made the trigger and an interrupt handler is operated.

[0058] Moreover, in order that control instruction may use another line physically [printing data] with the gestalt of the 2nd operation, From step S412 of drawing 8 to the step S415 is unnecessary among actuation of the interrupt handler of a laser beam printer 3. "It judges whether BIT 5-7 of a control line had change" before step S403, when a judgment result is yes, step S416 is performed, and when a judgment result is no, step S403 is performed.

[0059] As mentioned above, according to the gestalt of the 2nd operation, generate possibility that port setting out of the hardware used as compared with the gestalt of implementation of the above 1st must be changed, but Since the driver DLL which controls only BIT 5-7 of a control line is created independently and it can realize, modification to the data forwarding program using conventional Centronics As compared with the gestalt of implementation of the above 1st, it is few, and ends, and, thereby, the time amount which development takes can be shortened.

Moreover, even when a laser beam printer 3 cannot receive printing data in the state of memory full, the interruption and the termination of printing processing in a laser beam printer 3 are possible.

[0060] (3) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 3rd operation and the 3rd operation is explained based on drawing 12 , this printing system has composition equipped with the personal computer 21 as a host computer, and the laser beam printer 23 as a printer connected to this personal computer 21 through Centronics line 22a and control-line 22b.

[0061] Next, if the internal configuration of the personal computer 21 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 10 , the personal computer 21 has composition equipped with CPU24, RAM25, a hard disk 26, the user command input device 27, the Centronics port 28, control signal sending-out equipment 29, and Maine Bath 30.

[0062] If the configuration of each part of the above is explained in full detail, CPU24 will control each part of a personal computer based on a program. RAM25 is used as a work area. A hard disk 26 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard disk 26. The user command input unit 27 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 28 outputs printing data etc. to a laser beam printer 23 through Centronics line 22a. Control signal sending-out equipment 29 outputs a control signal to a laser beam printer 23 through control-line 22b. Maine Bath 30 is a common signalling channel.

[0063] Moreover, if the internal configuration of the laser beam printer 23 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 11 , the laser beam printer 23 has composition equipped with CPU31, RAM32 and ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, the electromagnetic wave signal receiving set 37, and Maine Bath 38.

[0064] If the configuration of each part of the above is explained in full detail, CPU31 will control each part of a laser beam printer based on a program. RAM32 is used as a work area. ROM33 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM33. The Centronics port 34 incorporates printing data from Centronics line 22a. The paper transport device 35 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 36 controls the device in which printing actuation is performed to a print form. The electromagnetic wave signal receiving set 37 receives an electromagnetic wave signal from control-line 22b. Maine Bath 38 is a common signalling channel.

[0065] In addition, especially with the gestalt of the 3rd operation, unless it refuses, CPU24 controls RAM25, a hard disk 26, the user command input unit 27, the Centronics port 28, and control signal sending-out equipment 29 by the personal computer 21 through Maine Bath 30, and CPU31 controls RAM32, ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, and the electromagnetic wave signal receiving set 37 by the laser beam

printer 23 through Maine Bath 38.

[0066] Actuation of the printing system concerning the gestalt of the 3rd operation is the same as that of the printing system concerning the gestalt of implementation of the above 2nd almost, and in order that only the sending-out approach of control instruction may carry out difference, only a difference is explained below.

[0067] In a personal computer 21 side, the class (printing stop instruction, the resumption instruction of printing, printing RESET instruction) of a send statement and the instruction concerned is sent out to control signal sending-out equipment 29 at the time of generating of a control instruction sending-out demand. The control signal sending-out equipment 29 which received the control instruction sending-out demand sends out the demanded control instruction. The three following approaches can be considered as the sending-out approach of control instruction.

[0068] (i) Three or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-7 of the control line of Example 1 of drawing 9, and control signal sending-out equipment 29 sends out an instruction according to that definition.

[0069] (ii) Two or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-6 of the control line of Example 2 of drawing 9, and control signal sending-out equipment 29 sends out an instruction according to that definition.

[0070] (iii) One or more lines by which the synchronizing signal for taking the synchronization at the time of the physical line for signal transduction performing 1 or more and signal transduction in a laser beam printer 23 and a personal computer 21 is flowing are at a certain time. Drawing 13 is the example of a definition of the signal at that time, and each instruction. In this case, control signal sending-out equipment 29 has always sent out the synchronizing signal.

[0071] In the laser beam printer 23 side, the electromagnetic wave signal receiving set 37 received the synchronizing signal sent out from the control signal sending-out equipment 29 of a personal computer 21, and has always taken control signal sending-out equipment 29 and a synchronization. And when the level of control signal line 22b has change, according to the definition of drawing 13, it analyzes whether it is which control instruction from the level change, and the analysis result is reflected in the printing status.

[0072] As mentioned above, since advice of control instruction can be performed even if it does not use the Centronics port, according to the gestalt of the 3rd operation, it has the advantage that there is no need of changing the driver which operates the port of Centronics. Moreover, even when a laser beam printer 23 cannot receive printing data in the state of memory full, interruption or a termination of printing processing of a laser beam printer 23 is possible.

[0073] (4) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 4th operation and the 4th operation is explained based on drawing 16, this printing system has composition equipped with the personal computer 41 as a host computer, and the laser beam printer 42 as a printer with which wireless is transmitted from this personal computer 41.

[0074] Next, if the internal configuration of the personal computer 41 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 14, the personal computer 41 has composition equipped with CPU43, RAM44, a hard disk 45, the user command input device 46, the Centronics port 47, the electromagnetic wave signal launcher 48, and Maine Bath 49.

[0075] If the configuration of each part of the above is explained in full detail, CPU43 will control each part of a personal computer based on a program. RAM44 is used as a work area. A hard disk 45 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard disk 45. The user command input unit 46 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 47 outputs printing data etc. The electromagnetic wave signal launcher 48 discharges an electromagnetic wave signal to a laser beam printer 42. Maine Bath 30 is a common signalling channel.

[0076] Moreover, if the internal configuration of the laser beam printer 42 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 15 , the laser beam printer 42 has composition equipped with CPU50, RAM51 and ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, the control signal receiving set 56, and Maine Bath 57.

[0077] If the configuration of each part of the above is explained in full detail, CPU50 will control each part of a laser beam printer based on a program. RAM51 is used as a work area. ROM52 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM52. The Centronics port 53 incorporates printing data etc. The paper transport device 54 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 55 controls the device in which printing actuation is performed to a print form. The control signal receiving set 56 receives a control signal. Maine Bath 57 is a common signalling channel.

[0078] In addition, especially with the gestalt of the 4th operation, unless it refuses, CPU43 controls RAM44, a hard disk 45, the user command input unit 46, the Centronics port 47, and the electromagnetic wave signal launcher 48 by the personal computer 41 through Maine Bath 49, and CPU50 controls RAM51, ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, and the control signal receiving set 56 by the laser beam printer 42 through Maine Bath 57.

[0079] The detail of operation of the gestalt of the 4th operation is the same as the gestalt of implementation of the above 3rd almost, and only the sending-out approach of control instruction carries out difference. Although the approach of notifying to a laser beam printer from a personal computer using a physical line was taken with the gestalt of implementation of the above 3rd, the approach of notifying to a laser beam printer 42 from a personal computer 41 using an electromagnetic wave is taken with the gestalt of the 4th operation. Since the discharge approach of an electromagnetic wave and the reception approach of an electromagnetic wave are well-known techniques, explanation is omitted. In addition, the definition approach of a signal is the same as the approach shown in above-mentioned drawing 13 .

[0080] As mentioned above, according to the gestalt of the 4th operation, in addition to the effectiveness in the gestalt of implementation of the above 3rd, there is an advantage that constraint of the physical location relation between a laser beam printer 42 and a personal computer 41 can be made loose.

[0081] In addition, even if it applies this invention to the system which consists of two or more devices, it may be applied to the equipment which consists of one device. Moreover, it cannot be overemphasized that this invention can be applied also when attained by supplying a program to a system or equipment. In this case, that system or equipment becomes possible [enjoying the effectiveness of this invention] by reading the storage which stored the program expressed by the software for attaining this invention to this system or equipment.

[0082]

[Effect of the Invention] As explained above, according to invention of claim 1, a host computer The input means for inputting the command which directs interruption of printing processing, a restart, or destruction of printing data to a printer, A transmitting means to transmit the inputted command to a printer immediately is provided. A printer A distinction means to distinguish the class of command received from the host computer, When a receiving command is distinguished from an interruption directive command, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in a printer are canceled. Since the control means with which a new printing instruction is equipped is provided, it is not necessary to perform useless printing and the futility of a form or a toner can be canceled. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.

[0083] According to invention of claim 2, in a printing system according to claim 1, a transmitting

means has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 1, in order to transmit using an electromagnetic wave.

[0084] According to invention of claim 3, it sets to a printing system according to claim 1, and a transmitting means becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 1, in order to transmit through lines other than the line used for the usual printing data transfer between a host computer and a printer.

[0085] In order to transmit using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while it sets to a printing system according to claim 1 according to invention of claim 4, and a transmitting means does so the same effectiveness as invention of claim 1, modification to the data-forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes]. [comparatively little]

[0086] According to invention of claim 5, it sets to a printing system according to claim 1. A transmitting means In order to set up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer and to transmit said command on said logical channel, While doing so the same effectiveness as invention of claim 1, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.

[0087] According to invention of claim 6, in a printing system according to claim 1, when printing data storage is in a full condition, or when [since it has the function which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 1,] a printer cannot receive printing data from a host computer, the interruption of printing processing of a printer of a printer is attained.

[0088] The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from a host computer to a printer according to invention of claim 7, The stroke which transmits the inputted command to a printer immediately, and the stroke from which a printer distinguishes the class of command received from the host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, Since it has the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in a printer when a receiving command is distinguished from a destruction directive command, It is not necessary to perform useless printing and the futility of a form or a toner can be canceled like invention of claim 1. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.

[0089] According to invention of claim 8, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 7, in order to carry out using an electromagnetic wave.

[0090] According to invention of claim 9, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 7, in order to carry out through lines other than the line used for the usual printing data transfer between a host computer and a printer.

[0091] According to invention of claim 10, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to carry out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while doing so the same effectiveness as

invention of claim 7 Modification to the data forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes].
[comparatively little]

[0092] According to invention of claim 11, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to transmit said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer, While doing so the same effectiveness as invention of claim 7, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.

[0093] According to invention of claim 12, when the printing data storage of a printer is in a full condition in the printing control approach according to claim 7, or when [since it has the stroke which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 7] a printer cannot receive printing data from a host computer, interruption of printing processing of a printer is attained.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to a printing system and the printing control approach, and when canceling the futility of a form or a toner by losing useless printing especially, it relates to a suitable printing system and the printing control approach.

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PRIOR ART

[Description of the Prior Art] Conventionally, there is a printing system equipped with the printer which prints and outputs the printing data which received printing data from the host computer which can be transmitted to a printer, and the host computer concerned for every page. In this kind of printing system, although printing data will not be sent out from a host computer after printing interruption directions to a printer if an operator inputs printing interruption directions from the keyboard of a host computer etc., the printout of the printing data which the printer has already received from the host computer is carried out from a printer before printing interruption directions.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, according to invention of claim 1, a host computer The input means for inputting the command which directs interruption of printing processing, a restart, or destruction of printing data to a printer, A transmitting means to transmit the inputted command to a printer immediately is provided. A printer A distinction means to distinguish the class of command received from the host computer, When a receiving command is distinguished from an interruption directive command, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in a printer are canceled. Since the control means with which a new printing instruction is equipped is provided, it is not necessary to perform useless printing and the futility of a form or a toner can be canceled. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.

[0083] According to invention of claim 2, in a printing system according to claim 1, a transmitting means has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 1, in order to transmit using an electromagnetic wave.

[0084] According to invention of claim 3, it sets to a printing system according to claim 1, and a transmitting means becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 1, in order to transmit through lines other than the line used for the usual printing data transfer between a host computer and a printer.

[0085] In order to transmit using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while it sets to a printing system according to claim 1 according to invention of claim 4, and a transmitting means does so the same effectiveness as invention of claim 1, modification to the data-forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes]. [comparatively little]

[0086] According to invention of claim 5, it sets to a printing system according to claim 1. A transmitting means In order to set up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer and to transmit said command on said logical channel, While doing so the same effectiveness as invention of claim 1, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.

[0087] According to invention of claim 6, in a printing system according to claim 1, when printing data storage is in a full condition, or when [since it has the function which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 1,] a printer cannot receive printing data from a host computer, the interruption of printing

processing of a printer of a printer is attained.

[0088] The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from a host computer to a printer according to invention of claim 7, The stroke which transmits the inputted command to a printer immediately, and the stroke from which a printer distinguishes the class of command received from the host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, Since it has the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in a printer when a receiving command is distinguished from a destruction directive command, It is not necessary to perform useless printing and the futility of a form or a toner can be canceled like invention of claim 1. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.

[0089] According to invention of claim 8, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 7, in order to carry out using an electromagnetic wave.

[0090] According to invention of claim 9, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 7, in order to carry out through lines other than the line used for the usual printing data transfer between a host computer and a printer.

[0091] According to invention of claim 10, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to carry out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while doing so the same effectiveness as invention of claim 7 Modification to the data forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes].
[comparatively little]

[0092] According to invention of claim 11, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to transmit said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer, While doing so the same effectiveness as invention of claim 7, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.

[0093] According to invention of claim 12, when the printing data storage of a printer is in a full condition in the printing control approach according to claim 7, or when [since it has the stroke which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 7] a printer cannot receive printing data from a host computer, interruption of printing processing of a printer is attained.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the conventional printing system, as mentioned above, when an operator performed printing interruption directions from a host computer, printing data [finishing / a printer / reception / from a host computer already] had the problem that a printout was carried out, before printing interruption directions. When having put in another way and the conventional printing system inputted interruption of printing of an operator, or directions of a termination into a host computer, while transmitting directions of an operator to the printer immediately from the host computer, when the printer received directions of printing interruption or a printing termination, processing which a paper jam does not generate immediately was performed and the function to in_which printing processing is interrupted or stopped did not have. Therefore, in the conventional printing system, useless printing was performed, consequently there was nonconformity that the futility of a form or a toner occurred. [0004] When this invention is made in view of the point mentioned above and an operator directs interruption or a termination of printing, it aims at offering the printing system and the printing control approach which made it possible to lose useless printing and to cancel the futility of a form or a toner etc. by interrupting or stopping printing processing immediately.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned object, invention of claim 1 In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page An input means for said host computer to input the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer, A transmitting means to transmit immediately the command inputted through this input means to said printer is provided. Said printer A distinction means to distinguish the class of command received from said host computer, When a receiving command is distinguished from an interruption directive command by this distinction means, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in the printer concerned are canceled. It is characterized by providing the control means with which a new printing instruction is equipped.

[0006] In order to attain the above-mentioned object, invention of claim 2 is characterized by transmitting said transmitting means using an electromagnetic wave in said printing system according to claim 1.

[0007] In order to attain the above-mentioned object, invention of claim 3 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting through lines other than the line used for the usual printing data transfer between said host computers and said printers.

[0008] In order to attain the above-mentioned object, invention of claim 4 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[0009] In order to attain the above-mentioned object, it sets to said printing system according to claim 1, said transmitting means sets up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and invention of claim 5 is characterized by transmitting said command on said logical channel.

[0010] In order to attain the above-mentioned object, it is characterized by invention of claim 6 having the function which said printer can receive [of said host computer to said command] even when printing data storage is in a full condition in said printing system according to claim 1.

[0011] In order to attain the above-mentioned object, invention of claim 7 In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer, The stroke which transmits the inputted command to said printer immediately, and the stroke from which said printer distinguishes the

class of command received from said host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, It is characterized by having the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command.

[0012] In order to attain the above-mentioned object, the stroke in which invention of claim 8 transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is characterized by carrying out using an electromagnetic wave.

[0013] In order to attain the above-mentioned object, invention of claim 9 is characterized by performing the stroke which transmits said inputted command to said printer immediately through lines other than the line used for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.

[0014] In order to attain the above-mentioned object, invention of claim 10 is characterized by performing the stroke which transmits said inputted command to said printer immediately using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.

[0015] In order to attain the above-mentioned object, invention of claim 11 is characterized by the stroke which transmits said inputted command to said printer immediately transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.

[0016] In order to attain the above-mentioned object, invention of claim 12 is characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7, even when the printing data storage of said printer is in a full condition.

[0017]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

[0018] (1) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 1st operation and the 1st operation is explained based on drawing 3, this printing system has composition equipped with the personal computer 1 as a host computer, and the laser beam printer 3 as a printer connected to this personal computer 1 through the Centronics line 2 (path cord corresponding to [for printers] a 24-bit parallel interface).

[0019] In addition, although the laser beam printer is raised with the gestalt of the gestalt of the 1st operation and the 2nd thru/or the 4th operation mentioned later to the example as a printer, it is possible to use the printer by the method of the arbitration of a non impact type (an electrophotography type, a hot printing type, a sensible-heat type, an ink jet type, an electrostatic type, discharge-breakdown type) or the impact types (dot impact type) as a printer.

[0020] Next, if the internal configuration of the personal computer 1 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 1, the personal computer 1 has composition equipped with CPU (central processing unit)4, RAM (at-any-time write-in read-out memory)5, a hard disk 6, the user command input device 7, the Centronics port 8, and Maine Bath 9.

[0021] If the configuration of each part of the above is explained in full detail, CPU4 will control each part of a personal computer based on a program. RAM5 is used as a work area. A hard disk 6 may store a program and a floppy disk, CDROM (Compact Disc ROM), MO, etc. may be used for it instead of a hard disk 6. The user command input unit 7 is for an operator to input commands, such as printing demand instruction / printing stop instruction, a printing termination order, and a resumption instruction of printing, and specifically consists of a mouse, a keyboard, etc. The Centronics port 8 outputs an instruction, a control channel initiation recognition signal,

control channel termination printing data, various recognition signals, etc. to a laser beam printer 3 through the Centronics line 2. Maine Bath 9 is a common signalling channel.

[0022] Moreover, if the internal configuration of the laser beam printer 3 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 2, the laser beam printer 3 has composition equipped with CPU10, RAM11 and ROM12, the Centronics port 13, the paper transport device 14, imprint equipment 15, and Maine Bath 16.

[0023] If the configuration of each part of the above is explained in full detail, CPU10 will control each part of a laser beam printer based on a program. RAM11 is used as a work area. ROM12 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM12. The Centronics port 13 incorporates an instruction, a control channel initiation recognition signal, control channel termination printing data, various recognition signals, etc. from the Centronics line 2. The paper transport device 14 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 15 controls the device in which printing actuation is performed to a print form. Maine Bath 16 is a common signalling channel.

[0024] In addition, especially with the gestalt of the 1st operation, unless it refuses, CPU4 controls RAM5, a hard disk 6, the user command input unit 7, and the Centronics port 8 by the personal computer 1 through Maine Bath 9, and CPU10 controls RAM11, ROM12, the Centronics port 13, the paper transport device 14, and imprint equipment 15 by the laser beam printer 3 through Maine Bath 15.

[0025] With the gestalt of the 1st operation, two logical channels are set up on the Centronics line 2 which connects a personal computer 1 and a laser beam printer 3, and drawing 4 is the schematic diagram showing the example. The control signal of a personal computer 1 is sent out through logical channel distribution equipment 17 to the logical channel C1 for control signal transmission of the Centronics line 2, and is memorized by the 1st memory 19 through the logical channel judging equipment 18 of a laser beam printer 3. Moreover, the printing data of a personal computer 1 are sent out through logical channel distribution equipment 17 to the logical channel C2 for data transmission of the Centronics line 2, and are memorized by the 2nd memory 20 through the logical channel judging equipment 18 of a laser beam printer 3.

[0026] Moreover, in the gestalt of the 1st operation, the program by the side of a personal computer 1 is divided into the printing data forwarding section program and the user interrupt processing section program. Fundamentally, the send state FLG (flag) which exists on RAM5 of a personal computer 1 is rewritten, when a user interrupt processing section program receives the interruption processing from an operator, and a printing data forwarding section program performs various processings with reference to it.

[0027] Next, said printing data forwarding section program is explained based on drawing 5. An operator creates data to print using application, after starting a printing system (step S101) (step S102). In addition, explanation is omitted in order for there to be nothing relation with the essence of this invention about the printing data origination approach. If an operator does the depression of the printing demand carbon button with which the user command input device 7 of a personal computer 1 is equipped (step S103), a printer driver will start creation of the printing data corresponding to the laser beam printer 3 which performs printing based on the printing data from application (step S104). A printer driver's termination of creation of printing data transmits printing data to printer Supra which transmits data to a laser beam printer 3 (step S106). (step S105)

[0028] Printer Supra starts transmission for the printing data of 1 byte of head from the Centronics port 8 to a laser beam printer 3 among the received printing data using the protocol of Centronics (step S107). Printer Supra sets the send state FLG which exists on RAM5 as CONTINUE (step S108). It judges that all transmission of printing data was completed when there were no printing data which should investigate whether printer Supra has printing data which should still be transmitted (step S110), and should be transmitted, a send state FLG is set to WAIT here (step S123), and this processing is ended.(step S124).

[0029] On the other hand, printer Supra investigates a send state FLG, when there are non-sent out data (step S111), and when a send state FLG is CONTINUE Continue return printing data transmission to the above-mentioned step S109, and when a send state FLG is not CONTINUE

It is recognized as printing stop instruction by the operator having been published, and a control channel initiation recognition signal is outputted from the Centronics port 8 to a laser beam printer 3 (step S112), and printing stop instruction is continuously outputted from the Centronics port 8 (step S113).

[0030] In addition, a control channel initiation recognition signal is 1 byte of signal, and the signal about a control-related logical channel will be transmitted until it transmits a control channel termination recognition signal after this. Moreover, the same value as 1 byte of this control channel initiation recognition signal shall not exist in printing data. When the same value as a control channel initiation recognition signal comes out by image data etc., a dummy bit is inserted in the creation time of printing data, and discernment processing of distinguishing from a control channel initiation recognition signal is performed.

[0031] Printer Supra investigates whether a send state FLG is DISCARD (step S114), when a send state FLG is DISCARD, it recognizes it as the printing termination order by the operator having been published, outputs a printing data RESET instruction from the Centronics port 8 to a laser beam printer 3 (step S120), and outputs a control channel termination recognition signal from the Centronics port 8 following it (step S121). Then, printer Supra cancels the printing data which are not sent [which is carrying out current maintenance] out (step S122), sets a send state FLG to WAIT (step S123), and ends this processing (step S124).

[0032] On the other hand, printer Supra stands by a new instruction of fixed time amount and an operator, when a send state FLG is not DISCARD (step S115). After fixed time amount, when a send state FLG is STOP, the answer of the (step S116 judges that there were not affirmation) and a user instruction input, and processes step S114 again. When a send state FLG is not STOP, the answer of the (step S116 investigates whether negative) and a send state FLG are CONTINUE(s) (step S117).

[0033] When a send state FLG is CONTINUE, printer Supra judges that there was a resumption instruction of printing from an operator, sends out the resumption instruction of printing to a laser beam printer 3 (step S118), sends out a control channel termination recognition signal continuously (step S119), and resumes return printing data forwarding processing to the above-mentioned step S109. When a send state FLG is not CONTINUE, it is recognized as the abnormalities in the status (operating state) having occurred, and shifts to the above-mentioned step S120.

[0034] Next, actuation of the interruption processing by the side of a personal computer 1 (host computer) is explained to a detail based on drawing 6 . It is inputted from the user command input device 7 (a keyboard or mouse), and the trigger of interruption from an operator is notified to the corresponding interrupt handler. In addition, the instruction about the gestalt of this operation which an operator can notify is three, printing interruption, resumption of printing, and a printing termination.

[0035] If the interrupt by the operator occurs with the user command input unit 7 (step S201), the interruption factor is acquired (step S202), and it stores on RAM5. subsequently, the case where a send state FLG is not WAIT with reference to the send state FLG on current RAM5 (step S203) — (— the answer of step S203 judged it as under printing data transmission (it contains also during interruption), and negative) and current printer Supra acquired at the above-mentioned step S202 — it interrupts and a factor is referred to.

[0036] When an interruption factor is printing interruption, the answer of the (step S204 sets affirmation) and a send state FLG as STOP (step S208), and ends this processing (step S219). When an interruption factor is resumption of printing, the answer of the (step S205 sets affirmation) and a send state FLG as CONTINUE (step S209), and ends this processing (step S214). When an interruption factor is a printing termination, the answer of the (step S206 sets affirmation) and a send state FLG as DISCARD (step S210), and ends this processing (step S219).

[0037] When a send state FLG is WAIT, it judges that the answer of the (step S203 has completed all printing data transmission by affirmation) and printer Supra, and the interrupt handler itself transmits control instruction to a laser beam printer 3. Then, a control channel initiation recognition signal is transmitted through the Centronics port 8 to a laser beam printer 3

(step S207), and the interruption factor acquired at the above-mentioned step S202 is referred to.

[0038] When an interruption factor is printing interruption, the answer of the (step S211 sends out printing stop instruction to affirmation) and a laser beam printer 3 (step S214), and performs step S218. When an interruption factor is resumption of printing, the answer of the (step S212 sends out the resumption instruction of printing to affirmation) and a laser beam printer 3 (step S215), and performs step S218. When an interruption factor is a printing termination, printing stop instruction is sent out to (step S213) and a laser beam printer 3 (step S216), a printing data RESET instruction is sent out continuously (step S217), and step S218 is performed. At step S218, a control channel termination recognition signal is sent out to a laser beam printer 3, and this processing is ended (step S219).

[0039] Next, actuation of the program of Maine by the side of a laser beam printer 3 (printer) is explained based on drawing 7. In a laser beam printer 3 side, printing processings (printing control, rasterizing, paper transfer control, etc.) are performed by the program of Maine, and an interrupt handler performs data reception from a personal computer 1 through the Centronics port 13. It opts for the processing which a main program should perform with reference to the printing status fundamentally. Moreover, an interrupt handler notifies the instruction received from the personal computer 1 to a main program by updating the printing status.

[0040] If a power source is switched on (step S301), a laser beam printer 3 will start processing, will initialize the laser beam printer concerned itself (step S302), and will set the printing status on RAM11 as printing activation (step S303). Subsequently, it investigates whether the printing data which should be printed in the 2nd memory 20 (refer to drawing 4) which is a printing data storage field on RAM11 are stored (step S304). When there are no data which should be printed, step S304 is performed again.

[0041] When there are data which should be printed, the printing status on RAM11 investigates whether it is printing activation (step S305). When the printing status is printing activation, printing processing of a page in which a degree should be printed is performed (step S306). And when the delivery of the paper which the page concerned printed is completed normally, the printing data on the 2nd memory 20 on (step S307) and RAM11 which ended printing processing are deleted (step S308), and step S304 is performed again.

[0042] In the above-mentioned step S305, when the printing status is not printing activation, it investigates whether the printing status is printing reset (step S309). When the printing status is printing reset, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled (step S310). And after initializing a laser beam printer 3 (step S311) and completing initialization, the printing status is set as activation (step S312), and step S304 is performed again.

[0043] In the above-mentioned step S309, when the printing status is not printing reset, the printing status investigates whether it is printing interruption (step S313). When the printing status is printing interruption, step S305 is performed that the following user command should be acquired. When the printing status is not printing interruption, it judges that the status is unusual, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled, and a laser beam printer 3 is initialized (step S314). After initialization is completed, the printing status is set as activation (step S315), and step S304 is performed again.

[0044] Next, actuation of the interrupt handler of a laser beam printer 3 (printer) is explained based on drawing 8. An interrupt handler is started at the time of completion of initialization of a laser beam printer 3 (step S401), and stands by interruption from a personal computer 1 (host computer) (step S402). Generating of interruption investigates whether nSTROB of the Centronics line 2 was turned off through the Centronics port 13 (step S403).

[0045] When not turned off, processing corresponding to each interruption is performed (step S405). When turned off, BUSY of the Centronics line 2 is set to HIGH through the Centronics port 13 (step S404), the further interruption from a personal computer 1 is refused, and data are incorporated from the DATA line of the Centronics line 2 through the Centronics port 13 (step S406). And the data concerned judge whether it is data of a control channel (step S407). In this case, it judges by whether it is data of the section when data were sandwiched by the control

channel initiation identifier and the termination identifier.

[0046] When the incorporated data are not data of a control channel, it is judged as the usual printing data and stores in the 2nd memory 20 on RAM11 (step S408). And it investigates whether there is any opening which can still store printing data in the 2nd memory 20 (step S409). When there is no opening in the 2nd memory 20, fixed time amount standby is carried out and step S409 is performed again. When an opening is in the 2nd memory 20, BUSY of the Centronics line 2 is set to LOW (step S410), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13 (step S411), 1 byte of data reception completion is notified, and step S402 is performed again that the following data should be received.

[0047] On the other hand, when the incorporated data are data of a control channel, it is judged as the data of control instruction and stores in the 1st memory 19 (refer to drawing 4) on RAM11 (step S412). And it investigates whether there is any opening which can still store control instruction data in the 1st memory 19 (step S413). When there is no opening in the 1st memory 19, fixed time amount standby is carried out and step S413 is performed again. When an opening is in the 1st memory 19, BUSY of the Centronics line 2 is set to LOW (step S414), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13, and 1 byte of data reception completion is notified (step S415).

[0048] It investigates whether the control instruction stored in the 1st memory 19 is printing stop instruction after advice of data reception completion (step S416). When control instruction is printing stop instruction, the printing status is set as printing interruption that it should notify to Maine (step S417), the printing stop instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.

[0049] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not printing stop instruction, it investigates whether the control instruction stored in the 1st memory 19 is a printing RESET instruction (step S418). When control instruction is a printing RESET instruction, the printing status is set as Printing RESET that it should notify to Maine (step S419), the printing RESET instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.

[0050] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a printing RESET instruction, it investigates whether the control instruction stored in the 1st memory 19 is a resumption instruction of printing (step S420). When control instruction is a resumption instruction of printing, the printing status is set as resumption of printing that it should notify to Maine (step S421), the resumption instruction of printing of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.

[0051] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a resumption instruction of printing, it is recognized as the abnormalities in the status having occurred, the printing status is set as Printing RESET (step S422), and step S402 is performed after setting-out termination.

[0052] As mentioned above, since the operator of a printing system can interrupt or stop printing processing of a laser beam printer 3 immediately when he directs interruption or a termination of printing to a laser beam printer 3 through the user command input unit 7 of a personal computer 1, while not performing useless printing and being able to cancel the futility of a form or a toner, according to the gestalt of the 1st operation, release of a laser beam printer 3 also becomes possible immediately. Moreover, a personal computer 1 and a laser beam printer 3 have the advantage that it is not necessary to add new hardware, by adopting the approach by the gestalt of the 1st operation. Moreover, it is possible to also realize port setting out of the hardware to be used in the conventional state.

[0053] (2) Replace the gestalt of operation of the gestalt 2nd of the 2nd operation with the approach of sending out control command in the gestalt of implementation of the above 1st using the data line of the Centronics line 2, and it notifies printing stop instruction, the resumption instruction of printing, and a printing termination order to a laser beam printer 3 using

the intact BIT number (5-7) of the control line of the Centronics line 2. Since it is the same as that of each bit control approach in nSTROB of the Centronics line 2 etc., the control approach of the control lines 5-BIT 7 is omitted for details.

[0054] Drawing 9 is drawing showing two examples of a definition of the control instruction of the control cutting tool of the Centronics control. Example 1 — a printing interruption instruction — in ON and the resumption instruction of printing, ON and a printing termination order set [BIT5] BIT7 to ON for BIT6. moreover — Example 2 — a printing interruption instruction — ON and a printing termination order carry out [BIT /5 / instruction / OFF (when BIT5 is always turned off during interruption and it is turned on, unless a laser beam printer 3 has a printing termination order, it is recognized as interruption instruction discharge), and / of printing / resumption] BIT6 as ON in BIT5. In addition, a printing termination order also has the approach for which nINIT of a control line is substituted.

[0055] The signal of a pulse condition is sent out by setting the control signal sending-out approach of each instruction for a laser beam printer 3 to HIGH from a personal computer 1 to each bit (DEFAULT level OFF) in the gestalt of the 2nd operation, and carrying out after [OFF] fixed time amount. Since the detail of the system configuration concerning the gestalt of the 2nd operation, an internal-block configuration, and actuation is almost the same as the gestalt of implementation of the above 1st, only a difference is explained below.

[0056] With the gestalt of the 2nd operation, since there is no need of setting up a logical channel in order to use a control line, sending-out" becomes unnecessary about a control channel termination identifier to sending-out" and "laser beam printer to "laser beam printer of operation applied to steps S112, S119, and S122 of drawing 5 R> 5, and steps S207 and S218 of drawing 6 among the actuation in a personal computer 1 in a control channel initiation identifier.

[0057] Moreover, with the gestalt of the 2nd operation, in a laser beam printer 3 side, when it interrupts, the controller is monitoring the condition of the control lines 5-BIT 7 continuously and the condition of a signal line has change, it is made the trigger and an interrupt handler is operated.

[0058] Moreover, in order that control instruction may use another line physically [printing data] with the gestalt of the 2nd operation, From step S412 of drawing 8 to the step S415 is unnecessary among actuation of the interrupt handler of a laser beam printer 3. "It judges whether BIT 5-7 of a control line had change" before step S403, when a judgment result is yes, step S416 is performed, and when a judgment result is no, step S403 is performed.

[0059] As mentioned above, according to the gestalt of the 2nd operation, generate possibility that port setting out of the hardware used as compared with the gestalt of implementation of the above 1st must be changed, but Since the driver DLL which controls only BIT 5-7 of a control line is created independently and it can realize, modification to the data forwarding program using conventional Centronics As compared with the gestalt of implementation of the above 1st, it is few, and ends, and, thereby, the time amount which development takes can be shortened. Moreover, even when a laser beam printer 3 cannot receive printing data in the state of memory full, the interruption and the termination of printing processing in a laser beam printer 3 are possible.

[0060] (3) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 3rd operation and the 3rd operation is explained based on drawing 12 , this printing system has composition equipped with the personal computer 21 as a host computer, and the laser beam printer 23 as a printer connected to this personal computer 21 through Centronics line 22a and control-line 22b.

[0061] Next, if the internal configuration of the personal computer 21 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 10 , the personal computer 21 has composition equipped with CPU24, RAM25, a hard disk 26, the user command input device 27, the Centronics port 28, control signal sending-out equipment 29, and Maine Bath 30.

[0062] If the configuration of each part of the above is explained in full detail, CPU24 will control each part of a personal computer based on a program. RAM25 is used as a work area. A hard disk 26 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard

disk 26. The user command input unit 27 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 28 outputs printing data etc. to a laser beam printer 23 through Centronics line 22a. Control signal sending-out equipment 29 outputs a control signal to a laser beam printer 23 through control-line 22b. Maine Bath 30 is a common signalling channel.

[0063] Moreover, if the internal configuration of the laser beam printer 23 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 11, the laser beam printer 23 has composition equipped with CPU31, RAM32 and ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, the electromagnetic wave signal receiving set 37, and Maine Bath 38.

[0064] If the configuration of each part of the above is explained in full detail, CPU31 will control each part of a laser beam printer based on a program. RAM32 is used as a work area. ROM33 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM33. The Centronics port 34 incorporates printing data from Centronics line 22a. The paper transport device 35 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 36 controls the device in which printing actuation is performed to a print form. The electromagnetic wave signal receiving set 37 receives an electromagnetic wave signal from control-line 22b. Maine Bath 38 is a common signalling channel.

[0065] In addition, especially with the gestalt of the 3rd operation, unless it refuses, CPU24 controls RAM25, a hard disk 26, the user command input unit 27, the Centronics port 28, and control signal sending-out equipment 29 by the personal computer 21 through Maine Bath 30, and CPU31 controls RAM32, ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, and the electromagnetic wave signal receiving set 37 by the laser beam printer 23 through Maine Bath 38.

[0066] Actuation of the printing system concerning the gestalt of the 3rd operation is the same as that of the printing system concerning the gestalt of implementation of the above 2nd almost, and in order that only the sending-out approach of control instruction may carry out difference, only a difference is explained below.

[0067] In a personal computer 21 side, the class (printing stop instruction, the resumption instruction of printing, printing RESET instruction) of a send statement and the instruction concerned is sent out to control signal sending-out equipment 29 at the time of generating of a control instruction sending-out demand. The control signal sending-out equipment 29 which received the control instruction sending-out demand sends out the demanded control instruction. The three following approaches can be considered as the sending-out approach of control instruction.

[0068] (i) Three or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-7 of the control line of Example 1 of drawing 9, and control signal sending-out equipment 29 sends out an instruction according to that definition.

[0069] (ii) Two or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-6 of the control line of Example 2 of drawing 9, and control signal sending-out equipment 29 sends out an instruction according to that definition.

[0070] (iii) One or more lines by which the synchronizing signal for taking the synchronization at the time of the physical line for signal transduction performing 1 or more and signal transduction in a laser beam printer 23 and a personal computer 21 is flowing are at a certain time. Drawing 13 is the example of a definition of the signal at that time, and each instruction. In this case, control signal sending-out equipment 29 has always sent out the synchronizing signal.

[0071] In the laser beam printer 23 side, the electromagnetic wave signal receiving set 37 received the synchronizing signal sent out from the control signal sending-out equipment 29 of a personal computer 21, and has always taken control signal sending-out equipment 29 and a synchronization. And when the level of control signal line 22b has change, according to the

definition of drawing 13 , it analyzes whether it is which control instruction from the level change, and the analysis result is reflected in the printing status.

[0072] As mentioned above, since advice of control instruction can be performed even if it does not use the Centronics port, according to the gestalt of the 3rd operation, it has the advantage that there is no need of changing the driver which operates the port of Centronics. Moreover, even when a laser beam printer 23 cannot receive printing data in the state of memory full, interruption or a termination of printing processing of a laser beam printer 23 is possible.

[0073] (4) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 4th operation and the 4th operation is explained based on drawing 16 , this printing system has composition equipped with the personal computer 41 as a host computer, and the laser beam printer 42 as a printer with which wireless is transmitted from this personal computer 41.

[0074] Next, if the internal configuration of the personal computer 41 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 14 , the personal computer 41 has composition equipped with CPU43, RAM44, a hard disk 45, the user command input device 46, the Centronics port 47, the electromagnetic wave signal launcher 48, and Maine Bath 49.

[0075] If the configuration of each part of the above is explained in full detail, CPU43 will control each part of a personal computer based on a program. RAM44 is used as a work area. A hard disk 45 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard disk 45. The user command input unit 46 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 47 outputs printing data etc. The electromagnetic wave signal launcher 48 discharges an electromagnetic wave signal to a laser beam printer 42. Maine Bath 30 is a common signalling channel.

[0076] Moreover, if the internal configuration of the laser beam printer 42 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 15 , the laser beam printer 42 has composition equipped with CPU50, RAM51 and ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, the control signal receiving set 56, and Maine Bath 57.

[0077] If the configuration of each part of the above is explained in full detail, CPU50 will control each part of a laser beam printer based on a program. RAM51 is used as a work area. ROM52 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM52. The Centronics port 53 incorporates printing data etc. The paper transport device 54 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 55 controls the device in which printing actuation is performed to a print form. The control signal receiving set 56 receives a control signal. Maine Bath 57 is a common signalling channel.

[0078] In addition, especially with the gestalt of the 4th operation, unless it refuses, CPU43 controls RAM44, a hard disk 45, the user command input unit 46, the Centronics port 47, and the electromagnetic wave signal launcher 48 by the personal computer 41 through Maine Bath 49, and CPU50 controls RAM51, ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, and the control signal receiving set 56 by the laser beam printer 42 through Maine Bath 57.

[0079] The detail of operation of the gestalt of the 4th operation is the same as the gestalt of implementation of the above 3rd almost, and only the sending-out approach of control instruction carries out difference. Although the approach of notifying to a laser beam printer from a personal computer using a physical line was taken with the gestalt of implementation of the above 3rd, the approach of notifying to a laser beam printer 42 from a personal computer 41 using an electromagnetic wave is taken with the gestalt of the 4th operation. Since the discharge approach of an electromagnetic wave and the reception approach of an electromagnetic wave are well-known techniques, explanation is omitted. In addition, the definition approach of a signal is the same as the approach shown in above-mentioned drawing 13 .

[0080] As mentioned above, according to the gestalt of the 4th operation, in addition to the effectiveness in the gestalt of implementation of the above 3rd, there is an advantage that constraint of the physical location relation between a laser beam printer 42 and a personal computer 41 can be made loose.

[0081] In addition, even if it applies this invention to the system which consists of two or more devices, it may be applied to the equipment which consists of one device. Moreover, it cannot be overemphasized that this invention can be applied also when attained by supplying a program to a system or equipment. In this case, that system or equipment becomes possible [enjoying the effectiveness of this invention] by reading the storage which stored the program expressed by the software for attaining this invention to this system or equipment.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the internal configuration of the personal computer concerning the gestalt of operation of the 1st of this invention.

[Drawing 2] It is the block diagram showing the internal configuration of the laser beam printer concerning the gestalt of the 1st operation.

[Drawing 3] It is the explanatory view showing the whole printing system configuration concerning the gestalt of the 1st operation.

[Drawing 4] It is the explanatory view showing two logical channels concerning the gestalt of the 1st operation.

[Drawing 5] It is the flow chart which shows actuation of printer Supra of the personal computer concerning the gestalt of the 1st operation.

[Drawing 6] It is the flow chart which shows actuation of the interruption processing by the side of the personal computer concerning the gestalt of the 1st operation.

[Drawing 7] It is the flow chart which shows actuation of the program of Maine by the side of the laser beam printer concerning the gestalt of the 1st operation.

[Drawing 8] It is the flow chart which shows actuation of the interrupt handler of the laser beam printer concerning the gestalt of the 1st operation.

[Drawing 9] It is the explanatory view showing two examples of a definition of the control instruction of the control cutting tool of the Centronics line concerning the gestalt of operation of the 2nd of this invention.

[Drawing 10] It is the block diagram showing the internal configuration of the personal computer concerning the gestalt of operation of the 3rd of this invention.

[Drawing 11] It is the block diagram showing the internal configuration of the laser beam printer concerning the gestalt of the 3rd operation.

[Drawing 12] It is the explanatory view showing the whole printing system configuration concerning the gestalt of the 3rd operation.

[Drawing 13] It is the explanatory view showing the example of a definition of a signal and each instruction concerning the gestalt of the 3rd operation.

[Drawing 14] It is the block diagram showing the internal configuration of the personal computer concerning the gestalt of operation of the 4th of this invention.

[Drawing 15] It is the block diagram showing the internal configuration of the laser beam printer concerning the gestalt of the 4th operation.

[Drawing 16] It is the explanatory view showing the whole printing system configuration concerning the gestalt of the 4th operation.

[Description of Notations]

1 Personal Computer (Host Computer)

3, 23, 42 Laser beam printer (printer)

7, 27, 46 User command input unit (input means)

8 Centronics Port (Transmitting Means)

10, 31, 50 CPU (a distinction means, control means)

29 Control Signal Sending-Out Equipment (Transmitting Means)

48 Electromagnetic Wave Signal Launcher (Transmitting Means)

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

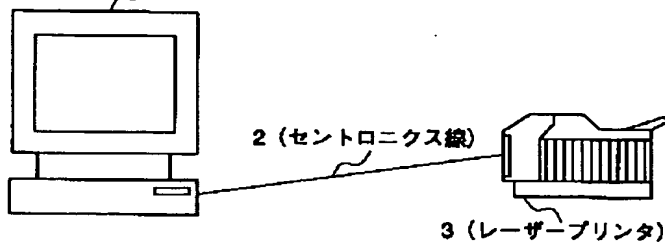
2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

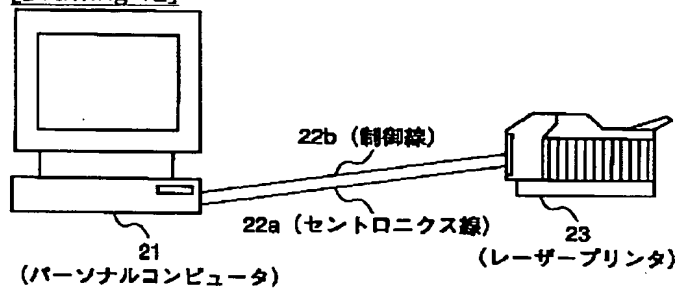
DRAWINGS

[Drawing 3]

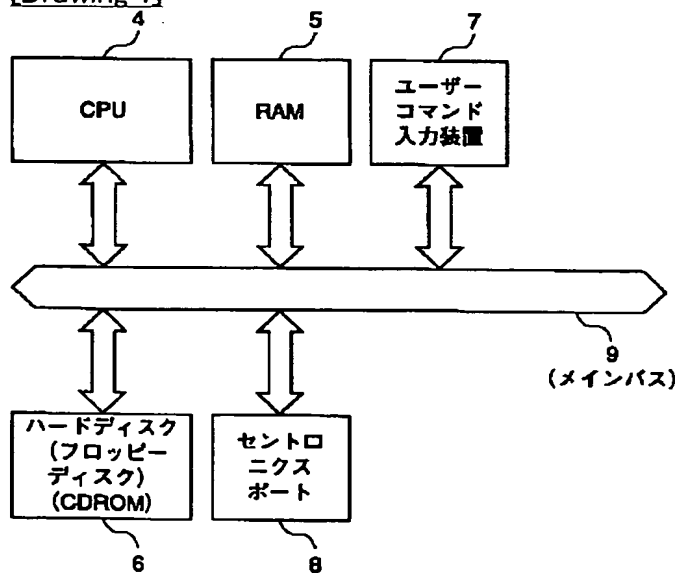
1 (パーソナルコンピュータ)



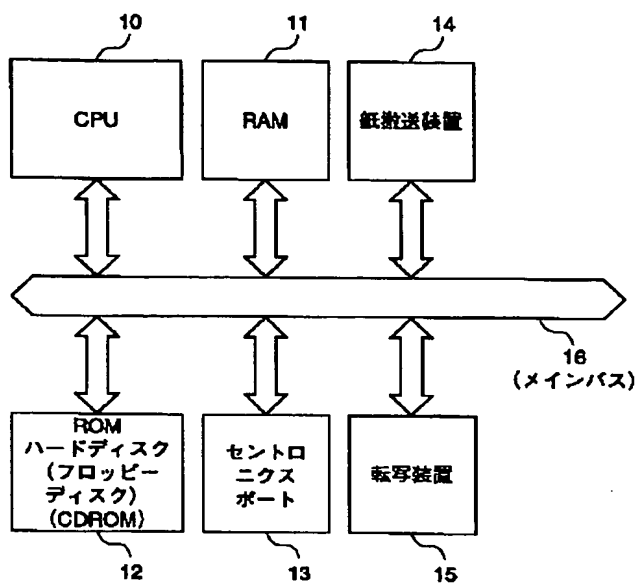
[Drawing 12]



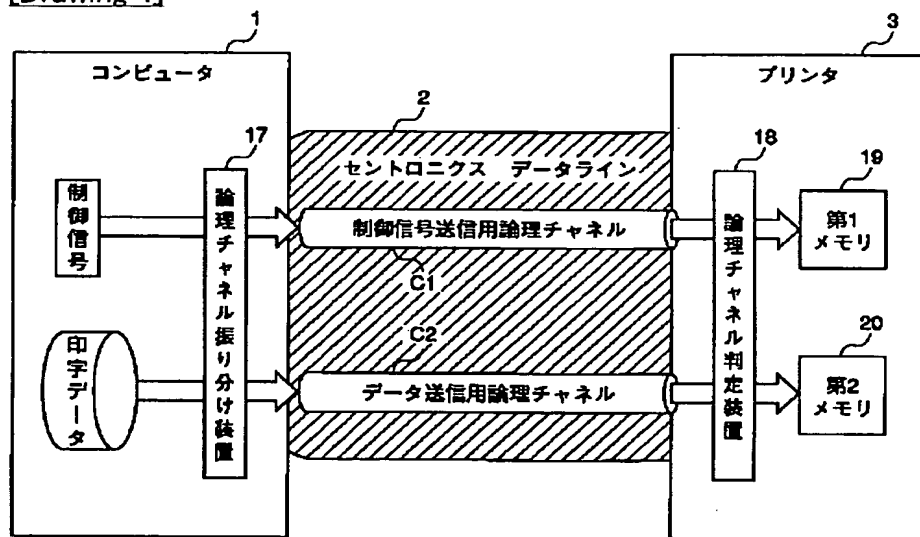
[Drawing 1]



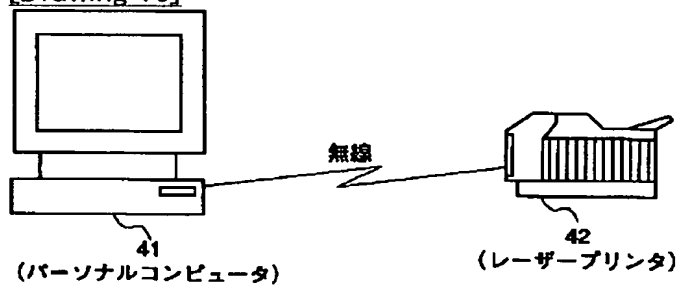
[Drawing 2]



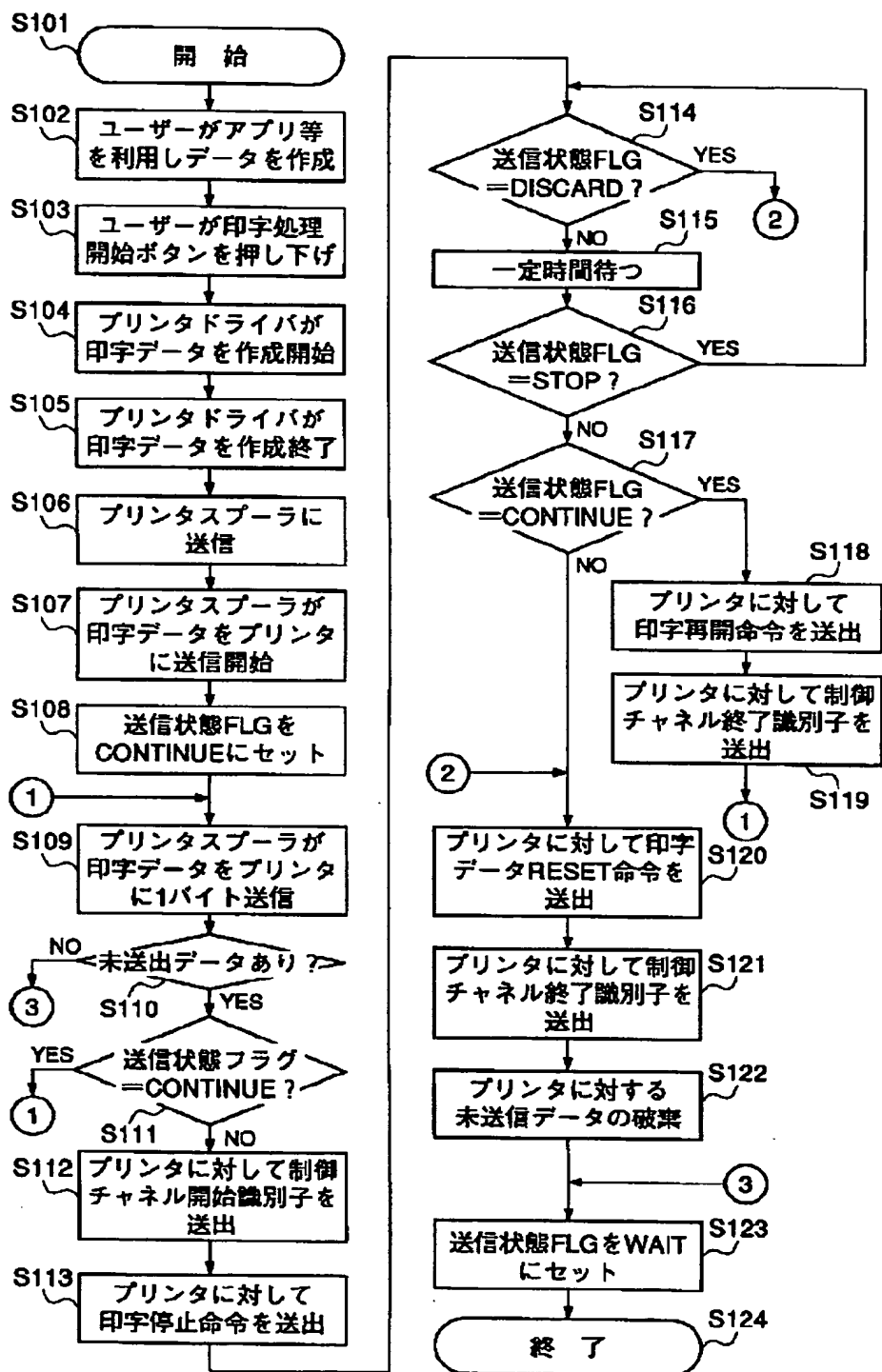
[Drawing 4]



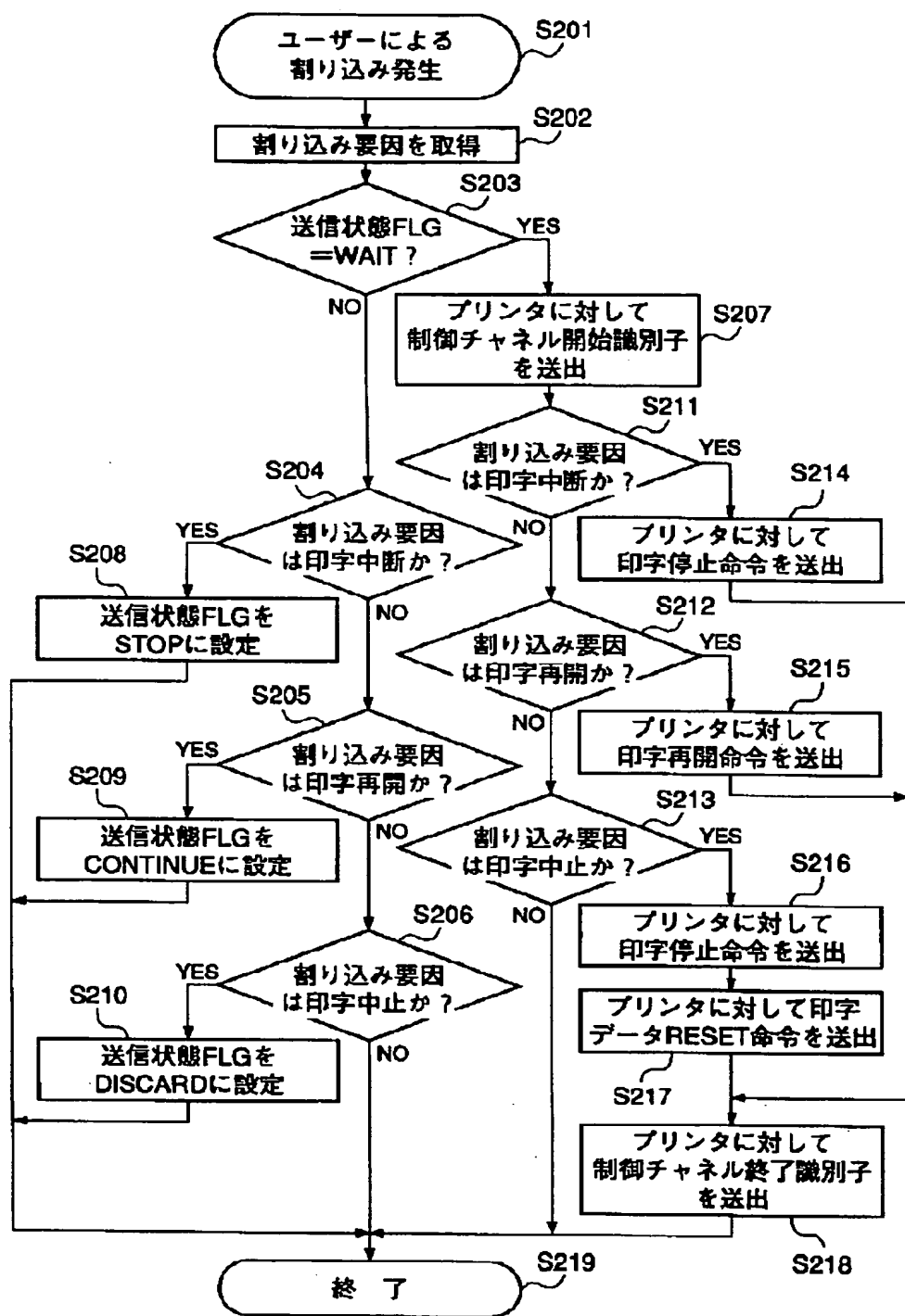
[Drawing 16]



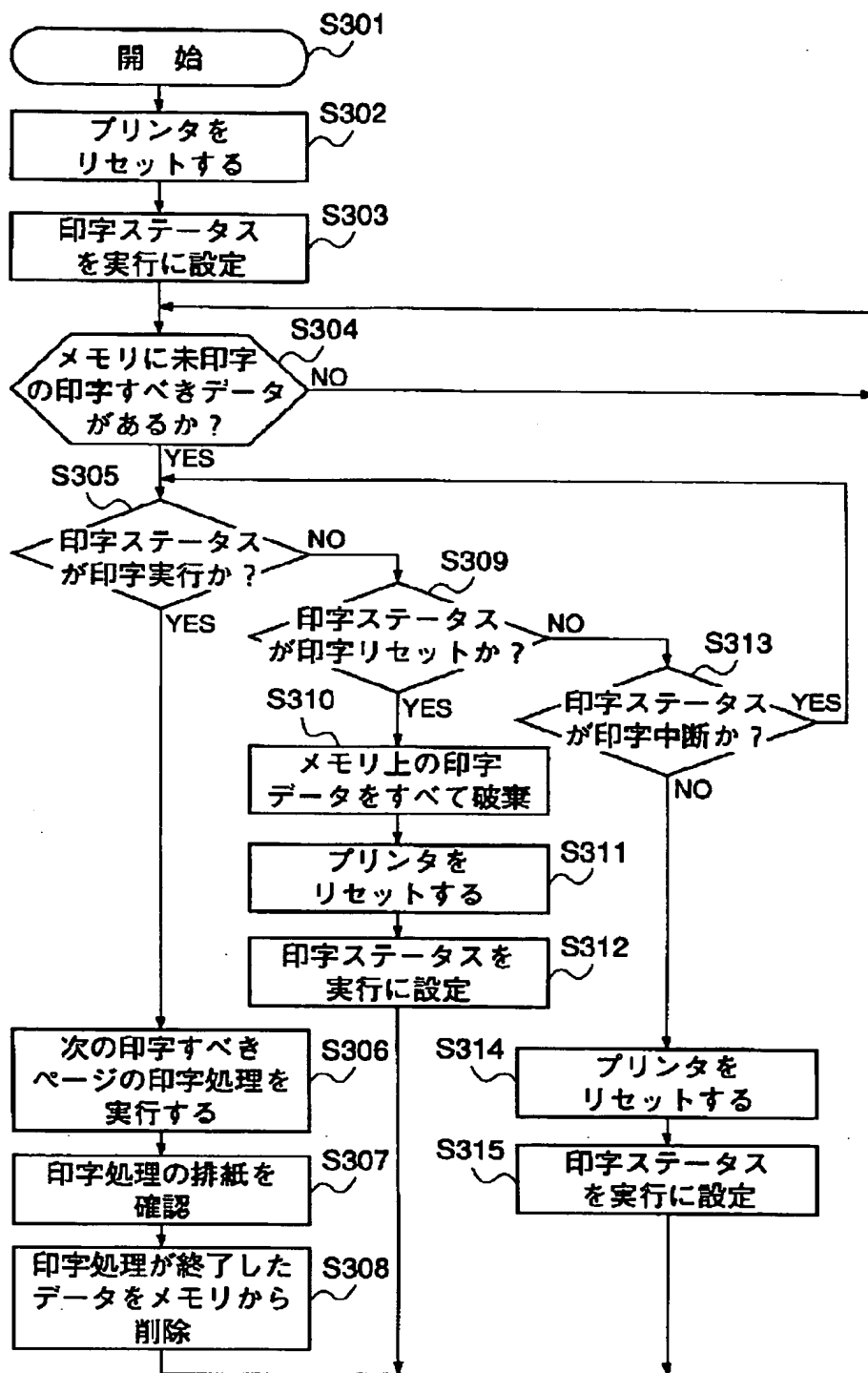
[Drawing 5]



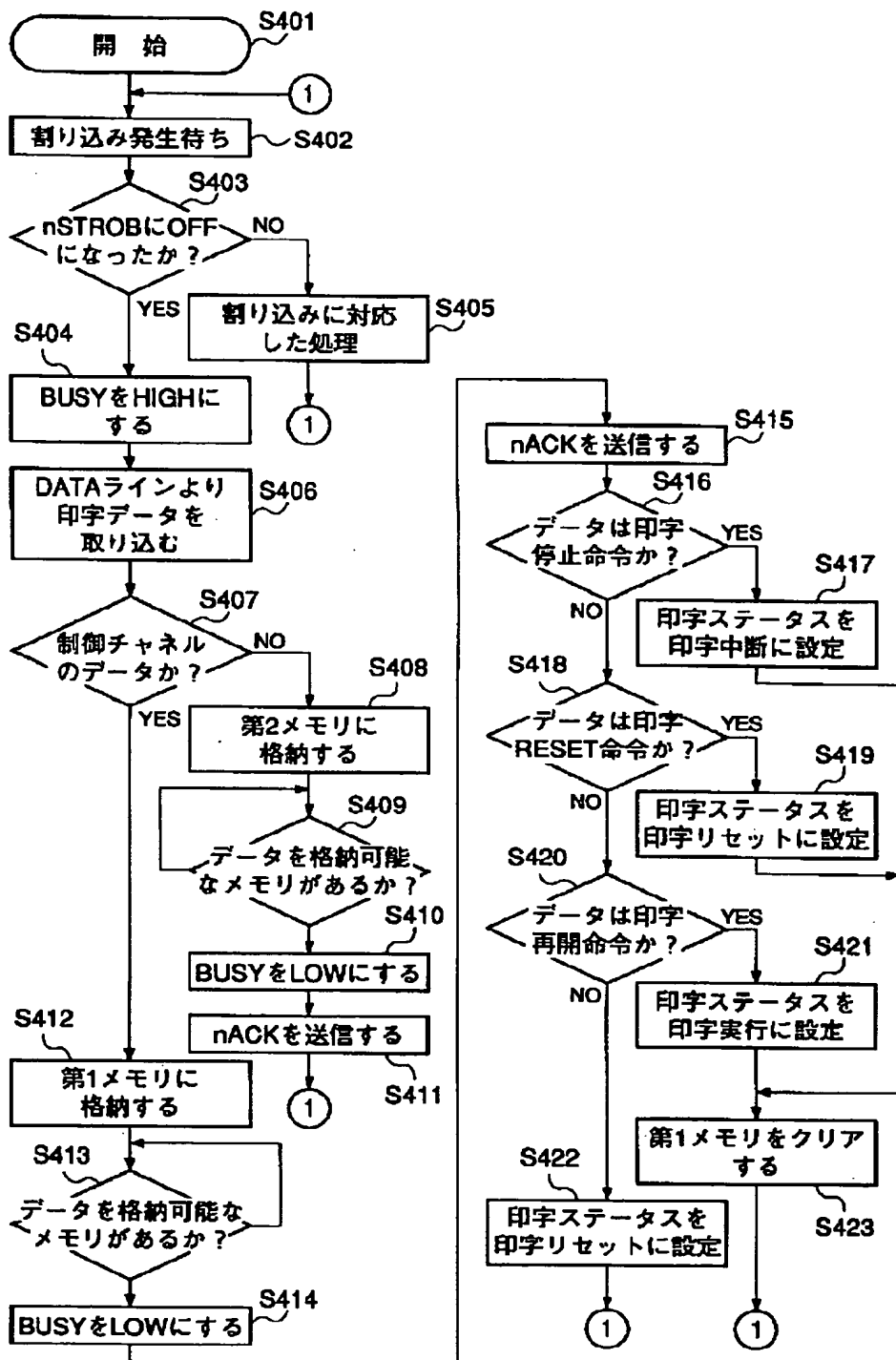
[Drawing 6]



[Drawing 7]



[Drawing 8]



[Drawing 9]

セントロニクス線 プリンターベンダーに開放されている
コントロールバイトの利用

例1

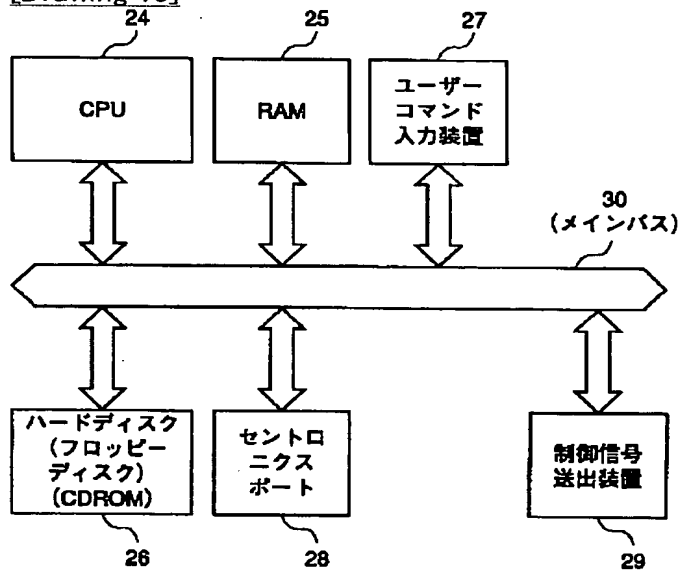
命令	BIT番号	5	6	7
印刷中断命令		ON	-	-
印刷再開命令		-	ON	-
印刷中止命令		-	-	ON

例2

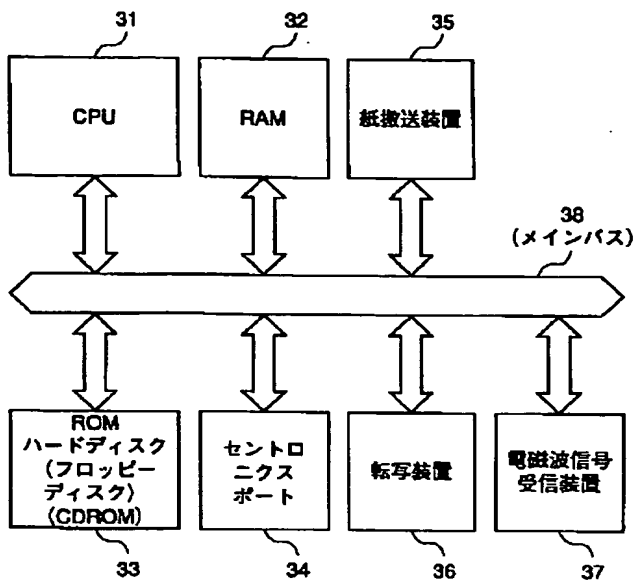
命令	BIT番号	5	6	7
印刷中断命令		OFF	-	-
印刷再開命令		ON	-	-
印刷中止命令		-	ON	-

(-.... DONT CARE)

[Drawing 10]



[Drawing 11]

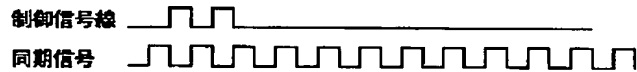


[Drawing 13]

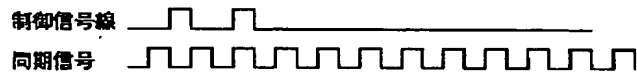
1 印字停止命令



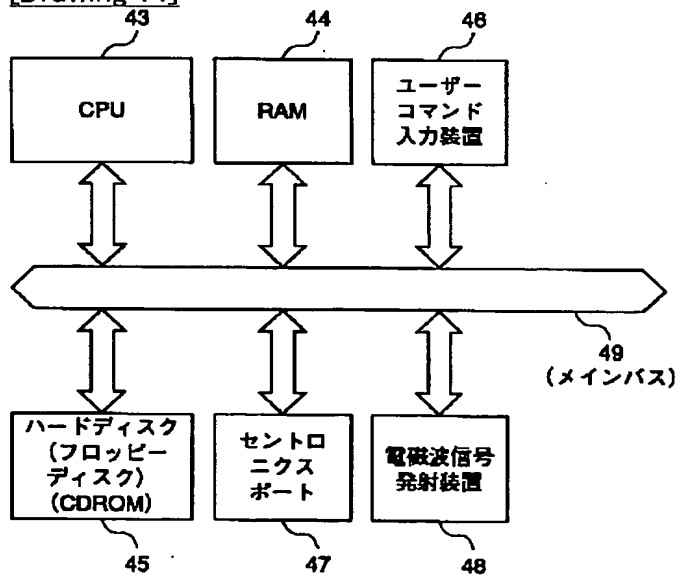
2 印字再開命令



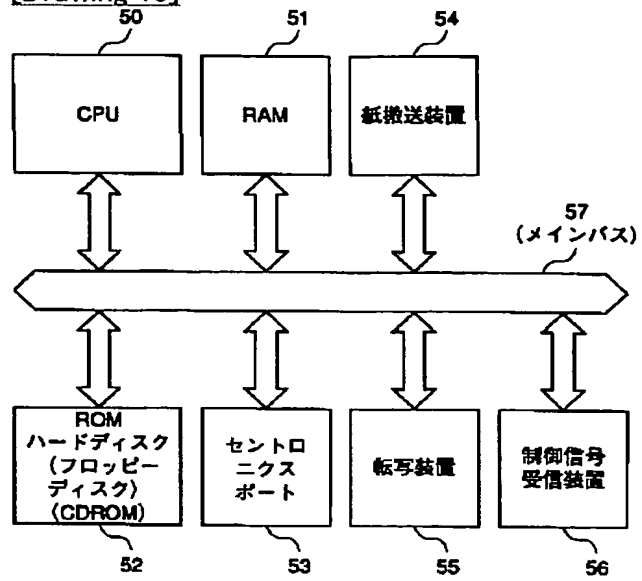
3 印字データRESET命令



[Drawing 14]



[Drawing 15]



[Translation done.]

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CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law

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B41J 5/30

29/38

[FI]

G06F 3/12 A

C

B41J 5/30 Z

29/38 Z

[Procedure amendment]

[Filing Date] June 29, Heisei 12 (2000. 6.29)

[Procedure amendment 1]

[Document to be Amended] Description

[Item(s) to be Amended] Claim

[Method of Amendment] Modification

[Proposed Amendment]

[Claim(s)]

[Claim 1] In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page,

The printing system characterized by providing the following. Said host computer is an input means for inputting the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer. It is a distinction means by which provide a transmitting means to transmit immediately the command inputted through this input means to said printer, and said printer distinguishes the class of command received from said host computer. The control means cancel all the printing data that are not printed in the printer concerned when make the printing processing under interruption resume when printing processing of the following page interrupts and a receiving command is distinguished from a restart directive command and a receiving command is distinguished from a destruction directive

command, while making the printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command by this distinction means, and have to a new printing instruction

[Claim 2] It is the printing system characterized by transmitting said transmitting means in said printing system according to claim 1 using an electromagnetic wave.

[Claim 3] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means through lines other than the line used for the usual printing data transfer between said host computers and said printers.

[Claim 4] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[Claim 5] It is the printing system which sets to said printing system according to claim 1, and is characterized by for said transmitting means setting up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and transmitting said command on said logical channel.

[Claim 6] Said printer is a printing system characterized by having the function which can receive said command from said host computer even when printing data storage is in a full condition in said printing system according to claim 1.

[Claim 7] In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page,

The printing control approach characterized by providing the following. The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer The stroke which transmits the inputted command to said printer immediately The stroke from which said printer distinguishes the class of command received from said host computer The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, the stroke which make the printing processing under interruption resume when a receiving command is distinguished from a restart directive command, and the stroke cancel all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command

[Claim 8] It is the printing control approach characterized by the stroke immediately transmitted to said printer performing said inputted command in said printing control approach according to claim 7 using an electromagnetic wave.

[Claim 9] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out through lines other than the line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 10] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[Claim 11] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 12] The printing control approach characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7 even when the printing data storage of said printer is in a full condition.

[Claim 13] It is the airline printer which has the function to print the printing data received from the host computer which has the function to transmit printing data for every page.

A receiving means to receive a command from said host computer.

A distinction means to distinguish the class of command received from said host computer.

The airline printer carried out [having the control means which cancels the printing data which are not printed in an airline printer when the printing processing under interruption / when a command is distinguished from an interruption directive command, interrupt printing processing of printing data, and / when a command is distinguished from a restart directive command is made to resume and a command is distinguished from a destruction directive command, and] as the description.

[Claim 14] Said receiving means is an airline printer according to claim 13 characterized by receiving a command using an electromagnetic wave.

[Claim 15] Said receiving means is an airline printer according to claim 13 characterized by receiving a command through lines other than the line used for the usual printing data transfer between said host computers and said airline printers.

[Claim 16] Said receiving means is an airline printer according to claim 13 characterized by receiving a command using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said airline printers.

[Claim 17] Said receiving means is an airline printer according to claim 13 characterized by receiving a command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said airline printers.

[Claim 18] Said receiving means is an airline printer according to claim 13 characterized by reception of a command being possible from said host computer even when the printing data storage of said airline printer is in a full condition.

[Procedure amendment 2]

[Document to be Amended] Description

[Item(s) to be Amended] 0016

[Method of Amendment] Modification

[Proposed Amendment]

[0016] In order to attain the above-mentioned object, invention of claim 12 is characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7, even when the printing data storage of said printer is in a full condition. In order to attain the above-mentioned object, invention of claim 13 A receiving means to be the airline printer which has the function to print the printing data received from the host computer which has the function to transmit printing data for every page, and to receive a command from said host computer. A distinction means to distinguish the class of command received from said host computer. When a command is distinguished from an interruption directive command, printing processing of printing data is interrupted. When the printing processing under interruption when a command is distinguished from a restart directive command is made to resume and a command is distinguished from a destruction directive command, it is characterized by having the control means which cancels the printing data which are not printed in an airline printer. In order to attain the above-mentioned object, invention of claim 14 is characterized by said receiving means receiving a command using an electromagnetic wave. In order to attain the above-mentioned object, invention of claim 15 is characterized by said receiving means receiving a command through lines other than the line used for the usual printing data transfer between said host computers and said airline printers. In order to attain the above-mentioned object, invention of claim 16 is characterized by said receiving means receiving a command using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said airline printers. In order to attain the above-mentioned object, invention of claim 17 is characterized by said receiving means receiving a command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said airline printers. In order to attain the above-mentioned object, invention of claim 18 is characterized by reception of said host computer to a command being possible for said receiving means, even when the printing data storage of said airline printer is in a full

condition.

[Procedure amendment 3]

[Document to be Amended] Description

[Item(s) to be Amended] 0093

[Method of Amendment] Modification

[Proposed Amendment]

[0093] According to invention of claim 12, when the printing data storage of a printer is in a full condition in the printing control approach according to claim 7, or when [since it has the stroke which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 7] a printer cannot receive printing data from a host computer, interruption of printing processing of a printer is attained. It is not necessary to perform useless printing and, according to invention of claim 13, the futility of a form or a toner can be canceled. Moreover, while release of the airline printer to a host computer also becomes possible immediately, a host computer and an airline printer have the advantage that it is not necessary to add new hardware. According to invention of claim 14, there is an advantage that constraint of the physical location relation between an airline printer and a host computer becomes loose. According to invention of claim 15, it becomes possible from a host computer to transmit the command to an airline printer immediately further. According to invention of claim 16, modification to the data forwarding program using Centronics becomes possible [shortening the time amount which there is and ends and development takes], [comparatively little] According to invention of claim 17, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics. According to invention of claim 18, even when an airline printer cannot receive printing data from a host computer, interruption of printing processing of an airline printer is attained.

[Translation done.]

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B 4 1 J	5/30		B 4 1 J 5/30	Z
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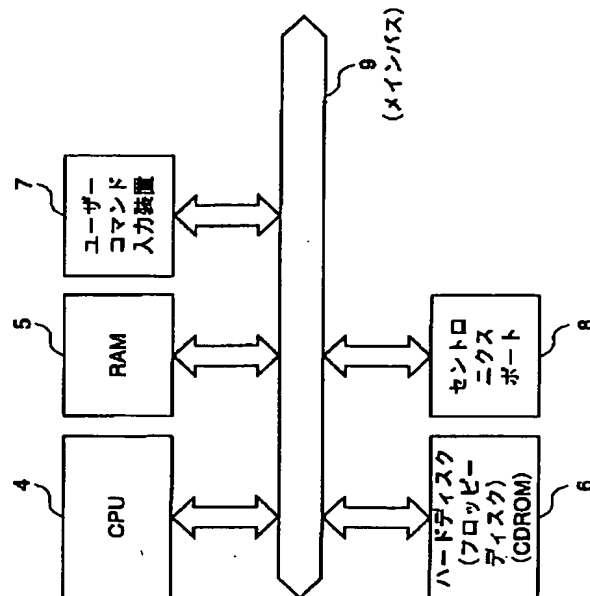
(74) 代理人 弁理士 渡部 敏彦

(54) 【発明の名称】 印刷システム及び印刷制御方法

(57) 【要約】

【課題】 操作者が印字の中断または中止を指示した際に即時に印字処理を中断または中止することにより、無駄な印字を無くし用紙やトナーの無駄を解消すること等を可能とした印刷システム及び印刷制御方法を提供する。

【解決手段】 パーソナルコンピュータ1は、レーザープリンタ3に印字処理の中断/再開/印字データの破棄を指示するコマンドを入力するユーザーコマンド入力装置7と、入力コマンドを即時に印字装置へ送信するセントロニクスポート8とを備え、レーザープリンタ3は、受信コマンドが中断コマンドの場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ、再開コマンドの場合に中断中の印字処理を再開させ、破棄コマンドの場合に当該印字装置内の未印字の全印字データを破棄するCPU10とを備える。



【特許請求の範囲】

【請求項1】 印字データを送信する機能を有するホストコンピュータと、該ホストコンピュータから受信した印字データを1頁毎に印字する機能を有する印字装置とを備えた印刷システムにおいて、

前記ホストコンピュータは、前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力するための入力手段と、該入力手段を介して入力されたコマンドを前記印字装置へ即時に送信する送信手段とを具備し、前記印字装置は、前記ホストコンピュータから受信したコマンドの種類を判別する判別手段と、該判別手段により受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させ、受信コマンドが破棄指示コマンドと判別された場合に当該印字装置内の未印字の全印字データを破棄し、新規の印字命令に備える制御手段とを具備することを特徴とする印刷システム。

【請求項2】 前記請求項1記載の印刷システムにおいて、前記送信手段は、電磁波を使用して送信することを特徴とする印刷システム。

【請求項3】 前記請求項1記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して送信することを特徴とする印刷システム。

【請求項4】 前記請求項1記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセンタロニクスラインの未使用のコントロールバイトを使用して送信することを特徴とする印刷システム。

【請求項5】 前記請求項1記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセンタロニクスラインのデータバイトの物理チャネル上に論理チャネルを設定し、前記論理チャネル上で前記コマンドの送信を行うことを特徴とする印刷システム。

【請求項6】 前記請求項1記載の印刷システムにおいて、前記印字装置は、印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な機能を有することを特徴とする印刷システム。

【請求項7】 印字データを送信する機能を有するホストコンピュータから受信した印字データを1頁毎に印字する機能を有する印字装置の印刷制御方法において、前記ホストコンピュータから前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力する行程と、入力されたコマンドを前記印字装置へ即時に送信する行程と、前記印字装置

が前記ホストコンピュータから受信したコマンドの種類を判別する行程と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させる行程と、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させる行程と、受信コマンドが破棄指示コマンドと判別された場合に前記印字装置内の未印字の全印字データを破棄する行程とを有することを特徴とする印刷制御方法。

10 【請求項8】 前記請求項7記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、電磁波を使用して行うことを特徴とする印刷制御方法。

【請求項9】 前記請求項7記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して行うことを特徴とする印刷制御方法。

20 【請求項10】 前記請求項7記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセンタロニクスラインの未使用のコントロールバイトを使用して行うことを特徴とする印刷制御方法。

【請求項11】 前記請求項7記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセンタロニクスラインのデータバイトの物理チャネル上に設定された論理チャネル上で前記コマンドの送信を行うことを特徴とする印刷制御方法。

【請求項12】 前記請求項7記載の印刷制御方法において、前記印字装置の印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な行程を有することを特徴とする印刷制御方法。

【発明の詳細な説明】

【0001】

40 【発明の属する技術分野】本発明は、印刷システム及び印刷制御方法に係り、特に、無駄な印字を無くすことにより用紙やトナーの無駄を解消する場合などに好適な印刷システム及び印刷制御方法に関する。

【0002】

【従来の技術】従来、印字データを印字装置へ送信可能なホストコンピュータと、当該ホストコンピュータから受信した印字データを1頁毎に印字して出力する印字装置とを備えた印刷システムが有る。この種の印刷システムにおいては、操作者がホストコンピュータのキーボード等から印字中断指示を入力すると、印字中断指示後は

ホストコンピュータからは印字データが印字装置へ送出されることはないが、印字中断指示前に印字装置がホストコンピュータから既に受信してしまっている印字データは、印字装置から印字出力されるようになっていた。

【0003】

【発明が解決しようとする課題】しかしながら、従来の印刷システムにおいては、上述したように操作者がホストコンピュータから印字中断指示を行った場合、印字中断指示前に印字装置がホストコンピュータから既に受信済みの印字データは印字出力されるという問題があった。換言すれば、従来の印刷システムは、操作者が印字の中断または中止の指示をホストコンピュータへ入力した際に、ホストコンピュータから操作者の指示を即時に印字装置へ伝達すると共に、印字装置は印字中断または印字中止の指示を受信すると、即時に紙詰まりが発生しないような処理を施して印字処理を中断または中止するような機能は備えていなかった。従って、従来の印刷システムでは、無駄な印字が行われ、その結果、用紙やトナーの無駄が発生するという不具合があった。

【0004】本発明は、上述した点に鑑みなされたものであり、操作者が印字の中断または中止を指示した際に即時に印字処理を中断または中止することにより、無駄な印字を無くし用紙やトナーの無駄を解消すること等を可能とした印刷システム及び印刷制御方法を提供することを目的とする。

【0005】

【課題を解決するための手段】上記目的を達成するため、請求項1の発明は、印字データを送信する機能を有するホストコンピュータと、該ホストコンピュータから受信した印字データを1頁毎に印字する機能を有する印字装置とを備えた印刷システムにおいて、前記ホストコンピュータは、前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力するための入力手段と、該入力手段を介して入力されたコマンドを前記印字装置へ即時に送信する送信手段とを具備し、前記印字装置は、前記ホストコンピュータから受信したコマンドの種類を判別する判別手段と、該判別手段により受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させ、受信コマンドが破棄指示コマンドと判別された場合に当該印字装置内の未印字の全印字データを破棄し、新規の印字命令に備える制御手段とを具備することを特徴とする。

【0006】上記目的を達成するため、請求項2の発明は、前記請求項1記載の印刷システムにおいて、前記送信手段は、電磁波を使用して送信することを特徴とする。

【0007】上記目的を達成するため、請求項3の発明

は、前記請求項1記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して送信することを特徴とする。

【0008】上記目的を達成するため、請求項4の発明は、前記請求項1記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセンシティブラインの未使用のコントロールバイトを使用して送信することを特徴とする。

【0009】上記目的を達成するため、請求項5の発明は、前記請求項1記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセンシティブラインのデータバイトの物理チャンネル上に論理チャンネルを設定し、前記論理チャンネル上で前記コマンドの送信を行うことを特徴とする。

【0010】上記目的を達成するため、請求項6の発明は、前記請求項1記載の印刷システムにおいて、前記印字装置は、印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な機能を有することを特徴とする。

【0011】上記目的を達成するため、請求項7の発明は、印字データを送信する機能を有するホストコンピュータから受信した印字データを1頁毎に印字する機能を有する印字装置の印刷制御方法において、前記ホストコンピュータから前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力する行程と、入力されたコマンドを前記印字装置へ即時に送信する行程と、前記印字装置が前記ホストコンピュータから受信したコマンドの種類を判別する行程と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させる行程と、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させる行程と、受信コマンドが破棄指示コマンドと判別された場合に前記印字装置内の未印字の全印字データを破棄する行程とを有することを特徴とする。

【0012】上記目的を達成するため、請求項8の発明は、前記請求項7記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、電磁波を使用して行うことを特徴とする。

【0013】上記目的を達成するため、請求項9の発明は、前記請求項7記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して行うことを特徴とする。

【0014】上記目的を達成するため、請求項10の発明は、前記請求項7記載の印刷制御方法において、前記

入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して行うことを特徴とする。

【0015】上記目的を達成するため、請求項11の発明は、前記請求項7記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャンネル上に設定された論理チャンネル上で前記コマンドの送信を行うことを特徴とする。

【0016】上記目的を達成するため、請求項12の発明は、前記請求項7記載の印刷制御方法において、前記印字装置の印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な行程を有することを特徴とする。

【0017】

【発明の実施の形態】以下、本発明の実施の形態を図面を参照して説明する。

【0018】(1)第1の実施の形態

まず、第1の実施の形態に係る印刷システムの全体構成を図3に基づき説明すると、本印刷システムは、ホストコンピュータとしてのパーソナルコンピュータ1と、該パーソナルコンピュータ1にセントロニクス線2（プリンタ用24ビット並列インタフェース対応の接続線）を介して接続された印字装置としてのレーザープリンタ3とを備える構成となっている。

【0019】尚、第1実施の形態及び後述する第2乃至第4の実施の形態では印字装置としてレーザープリンタを例に上げているが、印字装置としてはノンインパクト式（電子写真式、熱転写式、感熱式、インクジェット式、静電式、放電破壊式）あるいはインパクト式（ドット・インパクト式）の内の任意の方式による印字装置を用いることが可能である。

【0020】次に、第1の実施の形態に係る印刷システムのパーソナルコンピュータ1の内部構成を図1に基づき説明すると、パーソナルコンピュータ1は、CPU（中央処理装置）4と、RAM（随時書き込み読み出しメモリ）5と、ハードディスク6と、ユーザーコマンド入力装置7と、セントロニクスポート8と、メインバス9とを備える構成となっている。

【0021】上記各部の構成を詳述すると、CPU4は、プログラムに基づきパーソナルコンピュータ各部を制御する。RAM5は、ワークエリアとして使用される。ハードディスク6は、プログラムを格納するものであり、ハードディスク6の代わりにフロッピーディスク、CDROM（Compact Disc ROM）、MO等を使用してもよい。ユーザーコマンド入力装置7は、操作

者が印字要求命令・印字停止命令・印字中止命令・印字再開命令等のコマンドを入力するためのものであり、具体的にはマウスやキーボード等から構成される。セントロニクスポート8は、セントロニクス線2を介してレーザープリンタ3へ印字データ・各種命令・制御チャンネル開始識別信号・制御チャンネル終了識別信号等を出力する。メインバス9は、共通信号路である。

【0022】また、第1の実施の形態に係る印刷システムのレーザープリンタ3の内部構成を図2に基づき説明すると、レーザープリンタ3は、CPU10と、RAM11と、ROM12と、セントロニクスポート13と、紙搬送装置14と、転写装置15と、メインバス16とを備える構成となっている。

【0023】上記各部の構成を詳述すると、CPU10は、プログラムに基づきレーザープリンタ各部を制御する。RAM11は、ワークエリアとして使用される。ROM12は、プログラムを格納するものであり、ROM12の代わりにフロッピーディスク、CDROM、ハードディスク等を使用してもよい。セントロニクスポート13は、セントロニクス線2から印字データ・各種命令・制御チャンネル開始識別信号・制御チャンネル終了識別信号等を取り込む。紙搬送装置14は、レーザープリンタ内部で印字用紙の搬送を制御する。転写装置15は、印字用紙に印字動作を行う機構を制御する。メインバス16は、共通信号路である。

【0024】尚、第1の実施の形態では特に断らない限り、パーソナルコンピュータ1では、CPU4がメインバス9を介してRAM5、ハードディスク6、ユーザーコマンド入力装置7、セントロニクスポート8を制御し、レーザープリンタ3では、CPU10は、メインバス15を介してRAM11、ROM12、セントロニクスポート13、紙搬送装置14、転写装置15を制御する。

【0025】第1の実施の形態では、パーソナルコンピュータ1とレーザープリンタ3とを接続するセントロニクス線2上に論理チャンネルを2本設定しており、図4はその一例を示す概略図である。パーソナルコンピュータ1の制御信号は、論理チャンネル振り分け装置17を介してセントロニクス線2の制御信号送信用論理チャンネルC1へ送出され、レーザープリンタ3の論理チャンネル判定装置18を介して第1メモリ19に記憶される。また、パーソナルコンピュータ1の印字データは、論理チャンネル振り分け装置17を介してセントロニクス線2のデータ送信用論理チャンネルC2へ送出され、レーザープリンタ3の論理チャンネル判定装置18を介して第2メモリ20に記憶される。

【0026】また、第1の実施の形態においては、パーソナルコンピュータ1側のプログラムは、印字データ送出部プログラムとユーザー割り込み処理部プログラムとに分かれている。パーソナルコンピュータ1のRAM5

上に存在する送信状態FLG（フラグ）は、基本的にはユーザー割り込み処理部プログラムが操作者からの割り込み処理を受信したときに書き換え、印字データ送出部プログラムがそれを参照して様々な処理を実行するようになっている。

【0027】次に、前記印字データ送出部プログラムを図5に基づき説明する。操作者は印刷システムを立ち上げた後（ステップS101）、アプリケーションを用いて印字したいデータを作成する（ステップS102）。尚、印字データ作成方法に関しては本発明の本質とは関係無いため説明は省略する。操作者がパーソナルコンピュータ1のユーザーコマンド入力装置7に装備されている印字要求ボタンを押下すると（ステップS103）、プリンタドライバはアプリケーションからの印字データに基づき、印字を実行するレーザープリンタ3に対応した印字データの作成を開始する（ステップS104）。プリンタドライバが印字データの作成を終了すると（ステップS105）、レーザープリンタ3へデータを送信するプリンタスーブラに印字データを送信する（ステップS106）。

【0028】プリンタスーブラは受信した印字データの、先頭1バイトの印字データを、セントロニクスのプロトコルを使用してセントロニクスポート8からレーザープリンタ3へ送信を開始する（ステップS107）。プリンタスーブラはRAM5上に存在する送信状態FLGをCONTINUEに設定する（ステップS108）。ここで、プリンタスーブラはまだ送信すべき印字データが有るか否かを調べ（ステップS110）、送信すべき印字データが無い場合は印字データの送信が全て終了したと判断し、送信状態FLGをWAITにセットし（ステップS123）、本処理を終了する（ステップS124）。

【0029】他方、プリンタスーブラは未送出のデータが有る場合は送信状態FLGを調べ（ステップS111）、送信状態FLGがCONTINUEである場合は、上記ステップS109へ戻り印字データ送信を続行し、送信状態FLGがCONTINUEでない場合は、操作者による印字停止命令が発行されたと認識し、レーザープリンタ3に対して制御チャネル開始識別信号をセントロニクスポート8から出力し（ステップS112）、続いて印字停止命令をセントロニクスポート8から出力する（ステップS113）。

【0030】尚、制御チャネル開始識別信号とは1バイトの信号であり、この後、制御チャネル終了識別信号を送信するまでは、制御関連の論理チャネルに関する信号を送信することになる。また、この1バイトの制御チャネル開始識別信号と同じ値は、印字データ内には存在しないものとする。画像データ等で制御チャネル開始識別信号と同じ値が出てきたときは、印字データの作成時にダミービットを挿入して制御チャネル開始識別信号と区

別する等の識別処理を施す。

【0031】プリンタスーブラは送信状態FLGがDISCARDであるか否かを調べ（ステップS114）、送信状態FLGがDISCARDである場合は、操作者による印字中止命令が発行されたと認識し、レーザープリンタ3に対して印字データRESET命令をセントロニクスポート8から出力し（ステップS120）、それに続いて制御チャネル終了識別信号をセントロニクスポート8から出力する（ステップS121）。この後、プリンタスーブラが現在保持している未送出の印字データを破棄し（ステップS122）、送信状態FLGをWAITにセットし（ステップS123）、本処理を終了する（ステップS124）。

【0032】他方、プリンタスーブラは送信状態FLGがDISCARDでない場合は、一定時間、操作者の新たな命令を待機する（ステップS115）。一定時間後、送信状態FLGがSTOPである場合は（ステップS116の答が肯定）、ユーザー命令入力になかったと判断し、再度ステップS114の処理を行う。送信状態FLGがSTOPでない場合は（ステップS116の答が否定）、送信状態FLGがCONTINUEであるか否かを調べる（ステップS117）。

【0033】プリンタスーブラは送信状態FLGがCONTINUEである場合は、操作者からの印字再開命令があったと判断し、レーザープリンタ3に対して印字再開命令を送出し（ステップS118）、続いて制御チャネル終了識別信号を送出し（ステップS119）、上記ステップS109へ戻り印字データ送出処理を再開する。送信状態FLGがCONTINUEでない場合は、ステータス（動作状態）異常が発生したと認識し、上記ステップS120へ移行する。

【0034】次に、パーソナルコンピュータ1（ホストコンピュータ）側の割り込み処理の動作について図6に基づき詳細に説明する。操作者からの割り込みのトリガは、ユーザーコマンド入力装置7（キーボードまたはマウス等）から入力され、対応した割り込みハンドラに通知される。尚、操作者が通知可能な本実施の形態に関する命令は、印字中断、印字再開、印字中止の3つである。

【0035】ユーザーコマンド入力装置7により操作者による割り込みが発生すると（ステップS201）、その割り込み要因を取得し（ステップS202）、RAM5上に格納する。次いで、現在のRAM5上の送信状態FLGを参照し（ステップS203）、送信状態FLGがWAITでない場合は（ステップS203の答が否定）、現在プリンタスーブラが印字データ送信中（中断中も含む）と判断し、上記ステップS202で取得した割り込み要因を参照する。

【0036】割り込み要因が印字中断である場合は（ステップS204の答が肯定）、送信状態FLGをSTOP

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Pに設定し(ステップS208)、本処理を終了する(ステップS219)。割り込み要因が印字再開である場合は(ステップS205の答が肯定)、送信状態FLGをCONTINUEに設定し(ステップS209)、本処理を終了する(ステップS214)。割り込み要因が印字中止である場合は(ステップS206の答が肯定)、送信状態FLGをDISCARDに設定し(ステップS210)、本処理を終了する(ステップS219)。

【0037】送信状態FLGがWAITである場合は(ステップS203の答が肯定)、プリンタスーブラによる印字データ送信は全て完了していると判断し、割り込みハンドラ自身がレーザープリンタ3に対して制御命令を送信する。そこで、レーザープリンタ3に対してセントロニクスポート8を介して制御チャンネル開始識別信号を送信し(ステップS207)、上記ステップS202で取得した割り込み要因を参照する。

【0038】割り込み要因が印字中断である場合は(ステップS211の答が肯定)、レーザープリンタ3に対して印字停止命令を送出し(ステップS214)、ステップS218を実行する。割り込み要因が印字再開である場合は(ステップS212の答が肯定)、レーザープリンタ3に対して印字再開命令を送出し(ステップS215)、ステップS218を実行する。割り込み要因が印字中止である場合は(ステップS213)、レーザープリンタ3に対して印字停止命令を送出し(ステップS216)、続いて印字データRESET命令を送出し(ステップS217)、ステップS218を実行する。ステップS218ではレーザープリンタ3に対して制御チャンネル終了識別信号を送出し、本処理を終了する(ステップS219)。

【0039】次に、レーザープリンタ3(印字装置)側のメインのプログラムの動作について図7に基づき説明する。レーザープリンタ3側では、印字処理(印字制御、ラスタライズ、紙搬送制御等)はメインのプログラムで行い、割り込みハンドラによりセントロニクスポート13を介してパーソナルコンピュータ1からのデータ受信処理を行う。基本的にはメインプログラムが印字ステータスを参照して実行すべき処理を決定する。また、割り込みハンドラはパーソナルコンピュータ1から受信した命令を印字ステータスを更新することにより、メインプログラムに通知する。

【0040】電源が投入されると(ステップS301)、レーザープリンタ3は処理を開始して当該レーザープリンタ自身を初期化し(ステップS302)、RAM11上の印字ステータスを印字実行に設定する(ステップS303)。次いで、RAM11上の印字データ格納領域である第2メモリ20(図4参照)に印字すべき印字データが格納されているか否かを調べる(ステップS304)。印字すべきデータがない場合は、再度ス

テップS304を実行する。

【0041】印字すべきデータがある場合は、RAM11上の印字ステータスが印字実行か否かを調べる(ステップS305)。印字ステータスが印字実行である場合は、次の印字すべきページの印字処理を実行する(ステップS306)。そして、当該ページの印字した紙の排紙が正常に終了した時点で(ステップS307)、印字処理を終了したRAM11上の第2メモリ20上の印字データを削除し(ステップS308)、再度ステップS304を実行する。

【0042】上記ステップS305において、印字ステータスが印字実行でない場合は、印字ステータスが印字リセットであるか否かを調べる(ステップS309)。印字ステータスが印字リセットである場合は、RAM11上の印字データ格納領域である第2メモリ20内のデータを全て破棄する(ステップS310)。そして、レーザープリンタ3を初期化し(ステップS311)、初期化が終了すると、印字ステータスを実行に設定し(ステップS312)、再度ステップS304を実行する。

【0043】上記ステップS309において、印字ステータスが印字リセットでない場合は、印字ステータスが印字中断か否かを調べる(ステップS313)。印字ステータスが印字中断である場合は、次のユーザーコマンドを取得すべくステップS305を実行する。印字ステータスが印字中断でない場合は、ステータス異常と判断し、RAM11上の印字データ格納領域である第2メモリ20内のデータを全て破棄し、レーザープリンタ3を初期化する(ステップS314)。初期化が終了すると、印字ステータスを実行に設定し(ステップS315)、再度ステップS304を実行する。

【0044】次に、レーザープリンタ3(印字装置)の割り込みハンドラの動作について図8に基づき説明する。割り込みハンドラはレーザープリンタ3の初期化の完了時にスタートし(ステップS401)、パーソナルコンピュータ1(ホストコンピュータ)からの割り込みを待機する(ステップS402)。割り込みが発生すると、セントロニクスポート13を介してセントロニクス線2のnSTROBがOFFになったか否かを調べる(ステップS403)。

【0045】OFFになっていない場合は、それぞれの割り込みに対応した処理を実行する(ステップS405)。OFFになった場合は、セントロニクスポート13を介してセントロニクス線2のBUSYをHIGHにし(ステップS404)、パーソナルコンピュータ1からの更なる割り込みを拒否し、セントロニクスポート13を介してセントロニクス線2のDATAラインからデータを取り込む(ステップS406)。そして、当該データが制御チャンネルのデータか否かを判断する(ステップS407)。この場合、データが制御チャンネル開始識別子と終了識別子とによって挟まれた区間のデータか

否かで判断する。

【0046】取り込んだデータが制御チャネルのデータでない場合は、通常の印字データと判断し、RAM11上の第2メモリ20に格納する(ステップS408)。そして、第2メモリ20にまだ印字データを格納可能な空きが有るか否かを調べる(ステップS409)。第2メモリ20に空きが無い場合は、一定時間待機して再度ステップS409を実行する。第2メモリ20に空きが有る場合は、セントロニクス線2のBUSYをLOWにし(ステップS410)、パーソナルコンピュータ1からの次の割り込み受付可能である旨を当該コンピュータ1へ通知する。この後、セントロニクスポート13を介してセントロニクス線2のnACKを送信して(ステップS411)、1バイトのデータ受信処理完了を通知し、次のデータを受信すべく再度ステップS402を実行する。

【0047】他方、取り込んだデータが制御チャネルのデータである場合は、制御命令のデータと判断し、RAM11上の第1メモリ19(図4参照)に格納する(ステップS412)。そして、第1メモリ19にまだ制御命令データを格納可能な空きがあるか否かを調べる(ステップS413)。第1メモリ19に空きが無い場合は、一定時間待機して再度ステップS413を実行する。第1メモリ19に空きが有る場合は、セントロニクス線2のBUSYをLOWにし(ステップS414)、パーソナルコンピュータ1からの次の割り込み受付可能である旨を当該コンピュータ1へ通知する。この後、セントロニクスポート13を介してセントロニクス線2のnACKを送信し、1バイトのデータ受信処理完了を通知する(ステップS415)。

【0048】データ受信処理完了の通知後、第1メモリ19に格納した制御命令が印字停止命令であるか否かを調べる(ステップS416)。制御命令が印字停止命令である場合は、メインに通知すべく印字ステータスを印字中断に設定し(ステップS417)、設定終了後、第1メモリ19の印字停止命令をクリアし(ステップS423)、ステップS402を実行する。

【0049】上記ステップS416において、第1メモリ19に格納した制御命令が印字停止命令でない場合は、第1メモリ19に格納した制御命令が印字RESET命令であるか否かを調べる(ステップS418)。制御命令が印字RESET命令である場合は、メインに通知すべく印字ステータスを印字RESETに設定し(ステップS419)、設定終了後、第1メモリ19の印字RESET命令をクリアし(ステップS423)、ステップS402を実行する。

【0050】上記ステップS416において、第1メモリ19に格納した制御命令が印字RESET命令でない場合は、第1メモリ19に格納した制御命令が印字再開命令であるか否かを調べる(ステップS420)。制御

命令が印字再開命令である場合は、メインに通知すべく印字ステータスを印字再開に設定し(ステップS421)、設定終了後、第1メモリ19の印字再開命令をクリアし(ステップS423)、ステップS402を実行する。

【0051】上記ステップS416において、第1メモリ19に格納した制御命令が印字再開命令でない場合は、ステータス異常が発生したと認識し、印字ステータスを印字RESETに設定し(ステップS422)、設定終了後、ステップS402を実行する。

【0052】上述したように、第1の実施の形態によれば、印刷システムの操作者はパーソナルコンピュータ1のユーザーコマンド入力装置7を介してレーザープリンタ3に対し印字の中断または中止を指示した際に、レーザープリンタ3の印字処理を即座に中断または中止できるため、無駄な印字を行わなくて済み、用紙やトナーの無駄を解消することができると共に、レーザープリンタ3の解放も即座に可能となる。また、第1の実施の形態による方法を採用することにより、パーソナルコンピュータ1及びレーザープリンタ3ともに新たなハードウェアを追加しなくてもよいという利点がある。また、使用するハードウェアのポート設定も従来のままで実現することが可能である。

【0053】(2)第2の実施の形態

第2の実施の形態は、上記第1の実施の形態においてセントロニクス線2のデータラインを使用し制御コマンドを送出する方法に代えて、セントロニクス線2のコントロールラインの未使用のBIT番号(5~7)を使用して印字停止命令、印字再開命令、印字中止命令をレーザープリンタ3へ通知するようにしたものである。コントロールラインBIT5~7の制御方法は、セントロニクス線2のnSTROB等での個々のビット制御方法と同様であるため詳細は省略する。

【0054】図9はセントロニクス制御のコントロールビットの制御命令の2つの定義例を示す図である。例1では印刷中断命令はBIT5をON、印刷再開命令はBIT6をON、印刷中止命令はBIT7をONとする。また、例2では印刷中断命令はBIT5をOFF(中断中はBIT5を常にOFFし、ONになった時点でレーザープリンタ3は印刷中止命令が無い限り中断命令解除と認識する)、印刷再開命令はBIT5をON、印刷中止命令はBIT6をONとする。尚、印刷中止命令はコントロールラインのnINITで代用する方法もある。

【0055】第2の実施の形態においてパーソナルコンピュータ1からレーザープリンタ3に対する各命令の制御信号送出方法は、各ビット(DEFAULTレベルOFF)に対しHIGHにして一定時間後OFFにすることにより、パルス状態の信号を送出する。第2の実施の形態に係るシステム構成、内部ブロック構成、及び動作の詳細は上記第1の実施の形態とほぼ同様であるた

め、下記に相異点のみ説明する。

【0056】第2の実施の形態では、コントロールラインを使用するため、論理チャンネルを設定する必要が無いので、パーソナルコンピュータ1における動作の内、図5のステップS112、S119、S122、図6のステップS207、S218に係る動作“レーザープリンタに対して制御チャンネル開始識別子を送出”及び“レーザープリンタに対して制御チャンネル終了識別子を送出”が不要となる。

【0057】また、第2の実施の形態では、レーザープリンタ3側ではコントロールラインBIT5~7の状態を割り込みコントローラが常時監視しており、信号線の状態に変化があった場合、そのトリガにして割り込みハンドラを動作させる。

【0058】また、第2の実施の形態では、制御命令は印字データとは物理的に別の線を使用するため、レーザープリンタ3の割り込みハンドラの動作の内、図8のステップS412からステップS415までが不要であり、ステップS403の前において“コントロールラインのBIT5~7に変化があったか”を判定し、判定結果がyesの場合はステップS416を実行し、判定結果がnoの場合はステップS403を実行する。

【0059】上述したように、第2の実施の形態によれば、上記第1の実施の形態と比較し使用するハードウェアのポート設定は変更しななければならない可能性は発生するが、コントロールラインのBIT5~7のみを制御するドライバDLLを別に作成して実現できるため、従来のセントロニクスを利用したデータ送出プログラムに対する変更は、上記第1の実施の形態と比較して少なく済み、これにより、開発に要する時間を短縮することができる。また、レーザープリンタ3がメモリフル状態で印字データを受信できない場合でも、レーザープリンタ3における印字処理の中断や中止が可能である。

【0060】(3) 第3の実施の形態

まず、第3の実施の形態に係る印刷システムの全体構成を図12に基づき説明すると、本印刷システムは、ホストコンピュータとしてのパーソナルコンピュータ21と、該パーソナルコンピュータ21にセントロニクス線22a、制御線22bを介して接続された印字装置としてのレーザープリンタ23とを備える構成となっている。

【0061】次に、第3の実施の形態に係る印刷システムのパーソナルコンピュータ21の内部構成を図10に基づき説明すると、パーソナルコンピュータ21は、CPU24と、RAM25と、ハードディスク26と、ユーザーコマンド入力装置27と、セントロニクスポート28と、制御信号送出装置29と、メインバス30とを備える構成となっている。

【0062】上記各部の構成を詳述すると、CPU24は、プログラムに基づきパーソナルコンピュータ各部を

制御する。RAM25は、ワークエリアとして使用される。ハードディスク26は、プログラムを格納するものであり、ハードディスク26の代わりにフロッピーディスク、CDROM等を使用してもよい。ユーザーコマンド入力装置27は、操作者が各種コマンドを入力するためのものであり、具体的にはマウスやキーボード等から構成される。セントロニクスポート28は、セントロニクス線22aを介してレーザープリンタ23へ印字データ等を出力する。制御信号送出装置29は、制御線22bを介してレーザープリンタ23へ制御信号を出力する。メインバス30は、共通信号路である。

【0063】また、第3の実施の形態に係る印刷システムのレーザープリンタ23の内部構成を図11に基づき説明すると、レーザープリンタ23は、CPU31と、RAM32と、ROM33と、セントロニクスポート34と、紙搬送装置35と、転写装置36と、電磁波信号受信装置37と、メインバス38とを備える構成となっている。

【0064】上記各部の構成を詳述すると、CPU31は、プログラムに基づきレーザープリンタ各部を制御する。RAM32は、ワークエリアとして使用される。ROM33は、プログラムを格納するものであり、ROM33の代わりにフロッピーディスク、CDROM、ハードディスク等を使用してもよい。セントロニクスポート34は、セントロニクス線22aから印字データを取り込む。紙搬送装置35は、レーザープリンタ内部で印字用紙の搬送を制御する。転写装置36は、印字用紙に印字動作を行う機構を制御する。電磁波信号受信装置37は、制御線22bから電磁波信号を受信する。メインバス38は、共通信号路である。

【0065】尚、第3の実施の形態では特に断らない限り、パーソナルコンピュータ21では、CPU24がメインバス30を介してRAM25、ハードディスク26、ユーザーコマンド入力装置27、セントロニクスポート28、制御信号送出装置29を制御し、レーザープリンタ23では、CPU31は、メインバス38を介してRAM32、ROM33、セントロニクスポート34、紙搬送装置35、転写装置36、電磁波信号受信装置37を制御する。

【0066】第3の実施の形態に係る印刷システムの動作は、上記第2の実施の形態に係る印刷システムとほぼ同様であり、制御命令の送出方法のみが相異なるため、下記に相異点のみ説明する。

【0067】パーソナルコンピュータ21側では、制御命令送出要求の発生時に、送出命令と当該命令の種類(印字停止命令、印字再開命令、印字RESET命令)を制御信号送出装置29へ送出する。制御命令送出要求を受信した制御信号送出装置29は、要求された制御命令を送出する。制御命令の送出方法としては下記の3つの方法が考えられる。

【0068】(i) レーザープリンタ23とパーソナルコンピュータ21とに信号伝達用の物理線が3本以上ある時。この場合は、図9の例1のコントロール線のBIT5~7を利用した命令の定義方法と同じ定義方法により各命令と物理線を定義し、その定義に従って制御信号送出装置29が命令を送出する方法である。

【0069】(ii) レーザープリンタ23とパーソナルコンピュータ21とに信号伝達用の物理線が2本以上ある時。この場合は、図9の例2のコントロール線のBIT5~6を利用した命令の定義方法と同じ定義方法により各命令と物理線を定義し、その定義に従って制御信号送出装置29が命令を送出する方法である。

【0070】(iii) レーザープリンタ23とパーソナルコンピュータ21とに信号伝達用の物理線が1本以上、信号伝達を行う際の同期を取るための同期信号が流れている線が1本以上ある時。図13はその時の信号と各命令の定義例である。この場合は、制御信号送出装置29は常時同期信号を送出している。

【0071】レーザープリンタ23側では、電磁波信号受信装置37は常時、パーソナルコンピュータ21の制御信号送出装置29から送出されている同期信号を受信し、制御信号送出装置29と同期を取っている。そして、制御信号線22bのレベルに変化があった時、そのレベル変化から図13の定義に従って何れの制御命令であるかを解析し、その解析結果を印字ステータスに反映する。

【0072】上述したように、第3の実施の形態によれば、制御命令の通知はセントロニクスポートを使用しなくとも行うことができるため、セントロニクスのポートを操作するドライバを変更する必要が無いという利点がある。また、レーザープリンタ23がメモリフル状態で印字データを受信できない場合でも、レーザープリンタ23の印字処理の中断または中止が可能である。

【0073】(4) 第4の実施の形態

まず、第4の実施の形態に係る印刷システムの全体構成を図16に基づき説明すると、本印刷システムは、ホストコンピュータとしてのパーソナルコンピュータ41と、該パーソナルコンピュータ41から無線が送信される印字装置としてのレーザープリンタ42とを備える構成となっている。

【0074】次に、第4の実施の形態に係る印刷システムのパーソナルコンピュータ41の内部構成を図14に基づき説明すると、パーソナルコンピュータ41は、CPU43と、RAM44と、ハードディスク45と、ユーザーコマンド入力装置46と、セントロニクスポート47と、電磁波信号発射装置48と、メインバス49とを備える構成となっている。

【0075】上記各部の構成を詳述すると、CPU43は、プログラムに基づきパーソナルコンピュータ各部を制御する。RAM44は、ワークエリアとして使用され

る。ハードディスク45は、プログラムを格納するものであり、ハードディスク45の代わりにフロッピーディスク、CDROM等を使用してもよい。ユーザーコマンド入力装置46は、操作者が各種コマンドを入力するためのものであり、具体的にはマウスやキーボード等から構成される。セントロニクスポート47は、印字データ等を出力する。電磁波信号発射装置48は、レーザープリンタ42へ電磁波信号を発射する。メインバス30は、共通信路路である。

【0076】また、第4の実施の形態に係る印刷システムのレーザープリンタ42の内部構成を図15に基づき説明すると、レーザープリンタ42は、CPU50と、RAM51と、ROM52と、セントロニクスポート53と、紙搬送装置54と、転写装置55と、制御信号受信装置56と、メインバス57とを備える構成となっている。

【0077】上記各部の構成を詳述すると、CPU50は、プログラムに基づきレーザープリンタ各部を制御する。RAM51は、ワークエリアとして使用される。ROM52は、プログラムを格納するものであり、ROM52の代わりにフロッピーディスク、CDROM、ハードディスク等を使用してもよい。セントロニクスポート53は、印字データ等を取り込む。紙搬送装置54は、レーザープリンタ内部で印字用紙の搬送を制御する。転写装置55は、印字用紙に印字動作を行う機構を制御する。制御信号受信装置56は、制御信号を受信する。メインバス57は、共通信路路である。

【0078】尚、第4の実施の形態では特に断らない限り、パーソナルコンピュータ41では、CPU43がメインバス49を介してRAM44、ハードディスク45、ユーザーコマンド入力装置46、セントロニクスポート47、電磁波信号発射装置48を制御し、レーザープリンタ42では、CPU50は、メインバス57を介してRAM51、ROM52、セントロニクスポート53、紙搬送装置54、転写装置55、制御信号受信装置56を制御する。

【0079】第4の実施の形態は、動作の詳細は上記第3の実施の形態とほぼ同様であり、制御命令の送出方法のみが相異なる。上記第3の実施の形態では物理線を使用してパーソナルコンピュータからレーザープリンタへ通知する方法をとったが、第4の実施の形態では電磁波を使用してパーソナルコンピュータ41からレーザープリンタ42へ通知する方法をとっている。電磁波の発射方法及び電磁波の受信方法は公知技術であるため説明は省略する。尚、信号の定義方法は上記図13に示した方法と同じである。

【0080】上述したように、第4の実施の形態によれば、上記第3の実施の形態における効果に加えて、レーザープリンタ42とパーソナルコンピュータ41との物理的位置関係の制約を緩くすることができるという利点

がある。

【0081】尚、本発明は、複数の機器から構成されるシステムに適用しても、1つの機器からなる装置に適用しても良い。また、本発明は、システム或は装置にプログラムを供給することによって達成される場合にも適用できることは言うまでもない。この場合、本発明を達成するためのソフトウェアによって表されるプログラムを格納した記憶媒体を該システム或は装置に読み出すことによって、そのシステム或は装置が、本発明の効果を享受することが可能となる。

【0082】

【発明の効果】以上説明したように、請求項1の発明によれば、ホストコンピュータは、印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力するための入力手段と、入力されたコマンドを印字装置へ即時に送信する送信手段とを具備し、印字装置は、ホストコンピュータから受信したコマンドの種類を判別する判別手段と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させ、受信コマンドが破棄指示コマンドと判別された場合に印字装置内の未印字の全印字データを破棄し、新規の印字命令に備える制御手段とを具備しているため、無駄な印字を行わずに済み、用紙やトナーの無駄を解消することができる。また、ホストコンピュータに対する印字装置の解放も即座に可能となると共に、ホストコンピュータ及び印字装置ともに新たなハードウェアを追加しなくてもよいという利点がある。

【0083】請求項2の発明によれば、請求項1記載の印刷システムにおいて、送信手段は、電磁波を使用して送信するため、請求項1の発明と同様の効果を奏すると共に、印字装置とホストコンピュータとの物理的位置関係の制約が緩くなるという利点がある。

【0084】請求項3の発明によれば、請求項1記載の印刷システムにおいて、送信手段は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して送信するため、請求項1の発明と同様の効果を奏すると共に、ホストコンピュータから印字装置に対するコマンドをより一層即時に送信することが可能となる。

【0085】請求項4の発明によれば、請求項1記載の印刷システムにおいて、送信手段は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して送信するため、請求項1の発明と同様の効果を奏すると共に、セントロニクスを利用したデータ送出プログラムに対する変更は比較的少なく済み開発に要する時間を短縮することが可能となる。

【0086】請求項5の発明によれば、請求項1記載の印刷システムにおいて、送信手段は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャネル上に論理チャネルを設定し、前記論理チャネル上で前記コマンドの送信を行うため、請求項1の発明と同様の効果を奏すると共に、セントロニクスのポートを使用しなくともコマンドを送信でき、これにより、セントロニクスのポートを操作するハードウェアを変更することが不要となる。

【0087】請求項6の発明によれば、請求項1記載の印刷システムにおいて、印字装置は、印字データ記憶装置がフル状態の場合でもホストコンピュータからコマンドの受信が可能な機能を有するため、請求項1の発明と同様の効果を奏すると共に、印字装置がホストコンピュータから印字データを受信できない場合でも印字装置の印字処理の中断が可能となる。

【0088】請求項7の発明によれば、ホストコンピュータから印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力する行程と、入力されたコマンドを印字装置へ即時に送信する行程と、印字装置がホストコンピュータから受信したコマンドの種類を判別する行程と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させる行程と、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させる行程と、受信コマンドが破棄指示コマンドと判別された場合に印字装置内の未印字の全印字データを破棄する行程とを有するため、請求項1の発明と同様に、無駄な印字を行わずに済み、用紙やトナーの無駄を解消することができる。また、ホストコンピュータに対する印字装置の解放も即座に可能となると共に、ホストコンピュータ及び印字装置ともに新たなハードウェアを追加しなくてもよいという利点がある。

【0089】請求項8の発明によれば、請求項7記載の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、電磁波を使用して行うため、請求項7の発明と同様の効果を奏すると共に、印字装置とホストコンピュータとの物理的位置関係の制約が緩くなるという利点がある。

【0090】請求項9の発明によれば、請求項7記載の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して行うため、請求項7の発明と同様の効果を奏すると共に、ホストコンピュータから印字装置に対するコマンドをより一層即時に送信することが可能となる。

【0091】請求項10の発明によれば、請求項7記載

の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して行うため、請求項 7 の発明と同様の効果を奏すると共に、セントロニクスを利用したデータ送出プログラムに対する変更は比較的少なく済み開発に要する時間を短縮することが可能となる。

【0092】請求項 11 の発明によれば、請求項 7 記載の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャンネル上に設定された論理チャンネル上で前記コマンドの送信を行うため、請求項 7 の発明と同様の効果を奏すると共に、セントロニクスのポートを使用しなくともコマンドを送信でき、これにより、セントロニクスのポートを操作するハードウェアを変更することが不要となる。

【0093】請求項 12 の発明によれば、請求項 7 記載の印刷制御方法において、印字装置の印字データ記憶装置がフル状態の場合でもホストコンピュータからコマンドの受信が可能な行程を有するため、請求項 7 の発明と同様の効果を奏すると共に、印字装置がホストコンピュータから印字データを受信できない場合でも印字装置の印字処理の中断が可能となる。

【図面の簡単な説明】

【図 1】本発明の第 1 の実施の形態に係るパーソナルコンピュータの内部構成を示すブロック図である。

【図 2】第 1 の実施の形態に係るレーザープリンタの内部構成を示すブロック図である。

【図 3】第 1 の実施の形態に係る印刷システムの全体構成を示す説明図である。

【図 4】第 1 の実施の形態に係る 2 本の論理チャンネルを示す説明図である。

【図 5】第 1 の実施の形態に係るパーソナルコンピュータのプリンタスーブラの動作を示すフローチャートであ

る。

【図 6】第 1 の実施の形態に係るパーソナルコンピュータ側の割り込み処理の動作を示すフローチャートである。

【図 7】第 1 の実施の形態に係るレーザープリンタ側のメインのプログラムの動作を示すフローチャートである。

【図 8】第 1 の実施の形態に係るレーザープリンタの割り込みハンドラの動作を示すフローチャートである。

【図 9】本発明の第 2 の実施の形態に係るセントロニクス線のコントロールバイトの制御命令の 2 つの定義例を示す説明図である。

【図 10】本発明の第 3 の実施の形態に係るパーソナルコンピュータの内部構成を示すブロック図である。

【図 11】第 3 の実施の形態に係るレーザープリンタの内部構成を示すブロック図である。

【図 12】第 3 の実施の形態に係る印刷システムの全体構成を示す説明図である。

【図 13】第 3 の実施の形態に係る信号と各命令の定義例を示す説明図である。

【図 14】本発明の第 4 の実施の形態に係るパーソナルコンピュータの内部構成を示すブロック図である。

【図 15】第 4 の実施の形態に係るレーザープリンタの内部構成を示すブロック図である。

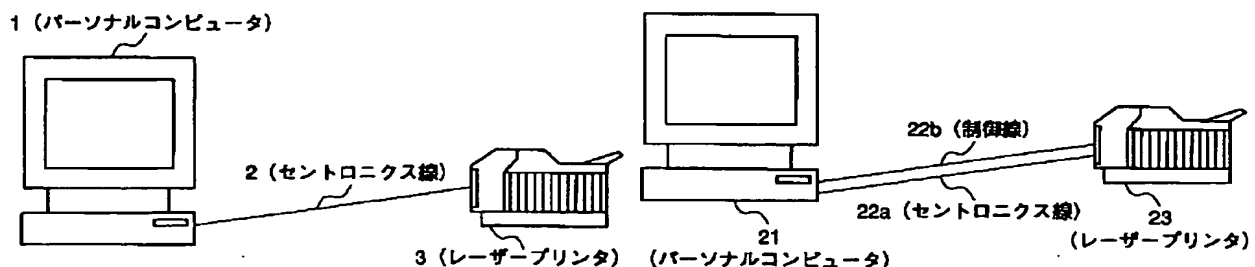
【図 16】第 4 の実施の形態に係る印刷システムの全体構成を示す説明図である。

【符号の説明】

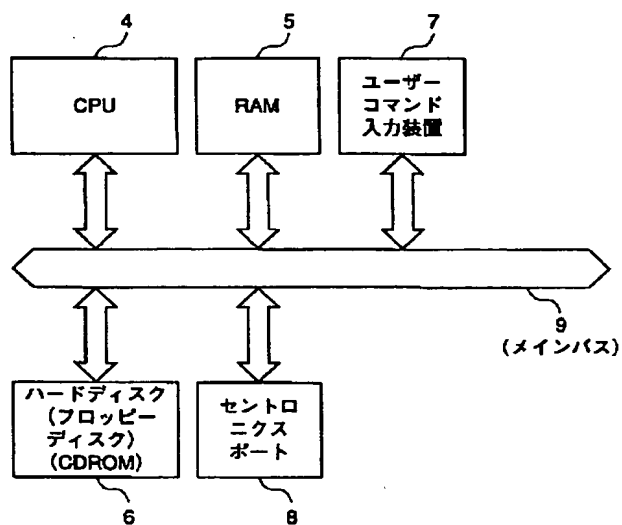
- 1 パーソナルコンピュータ (ホストコンピュータ)
- 3、23、42 レーザープリンタ (印字装置)
- 7、27、46 ユーザーコマンド入力装置 (入力手段)
- 8 セントロニクスポート (送信手段)
- 10、31、50 CPU (判別手段、制御手段)
- 29 制御信号送出装置 (送信手段)
- 48 電磁波信号発射装置 (送信手段)

【図 3】

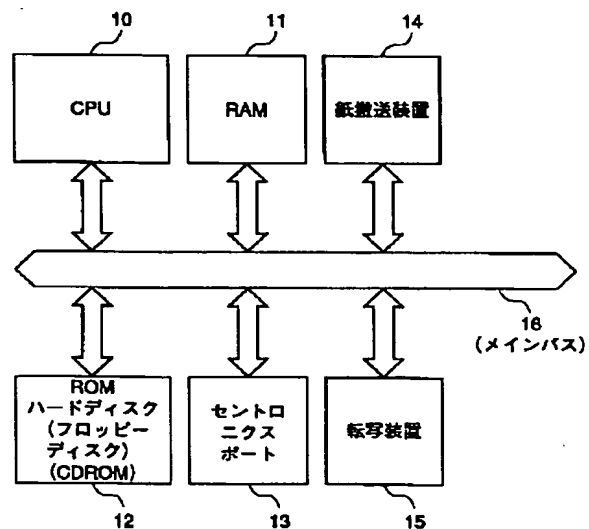
【図 12】



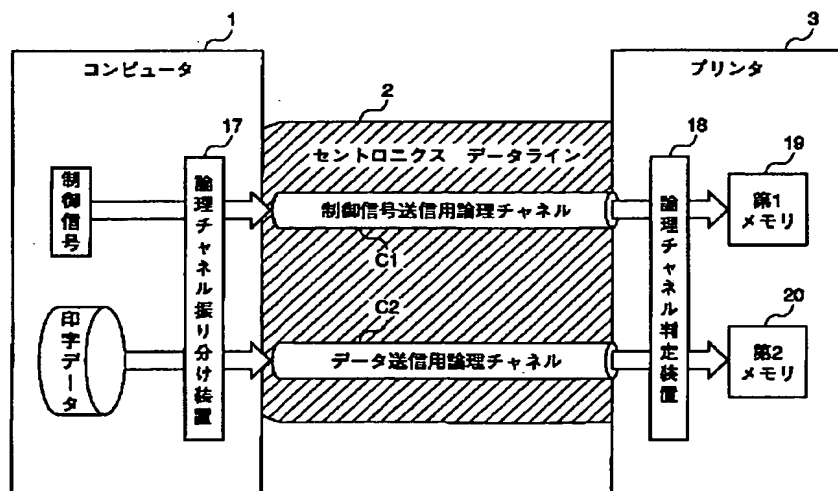
【図1】



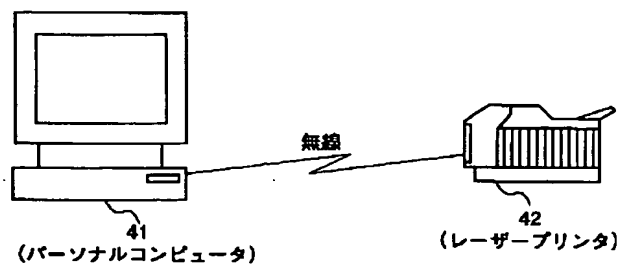
【図2】



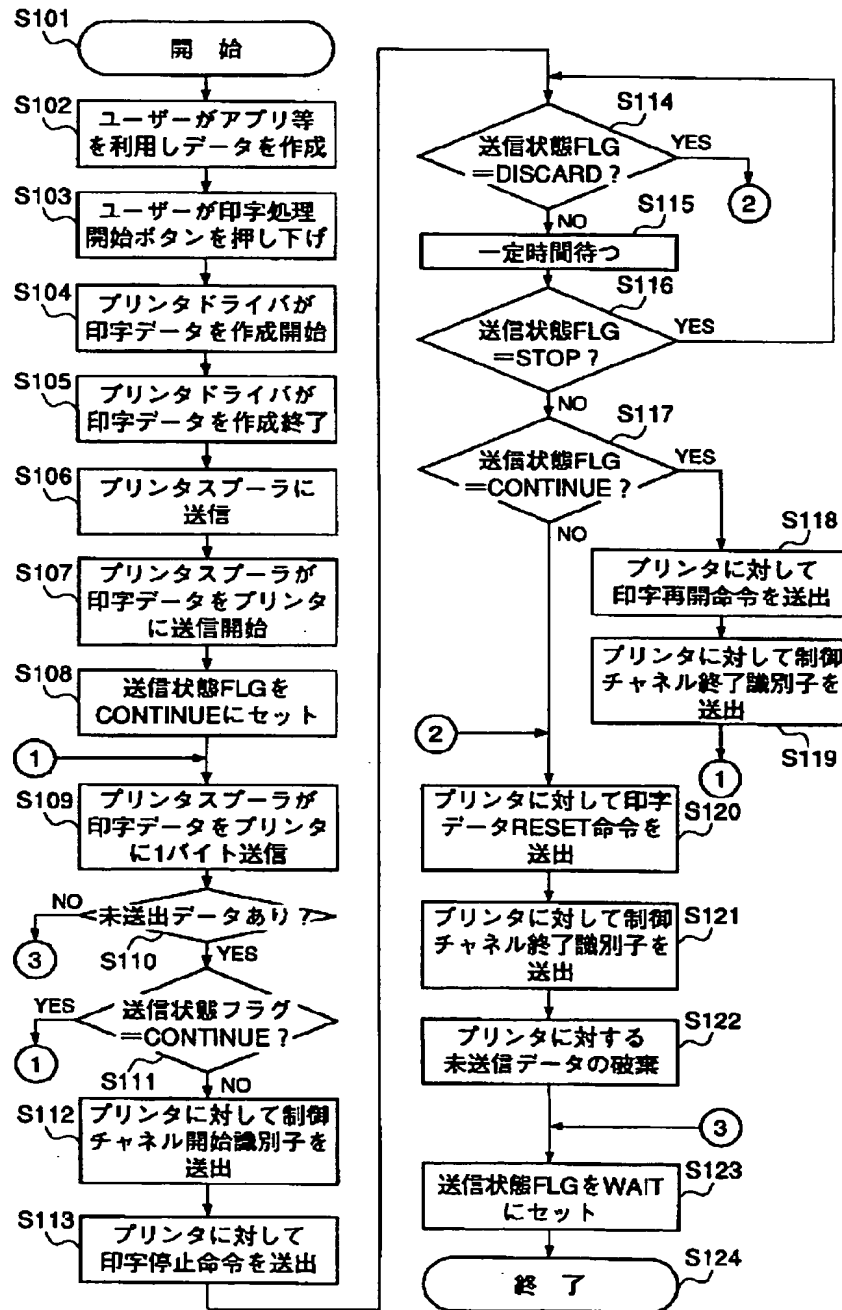
【図4】



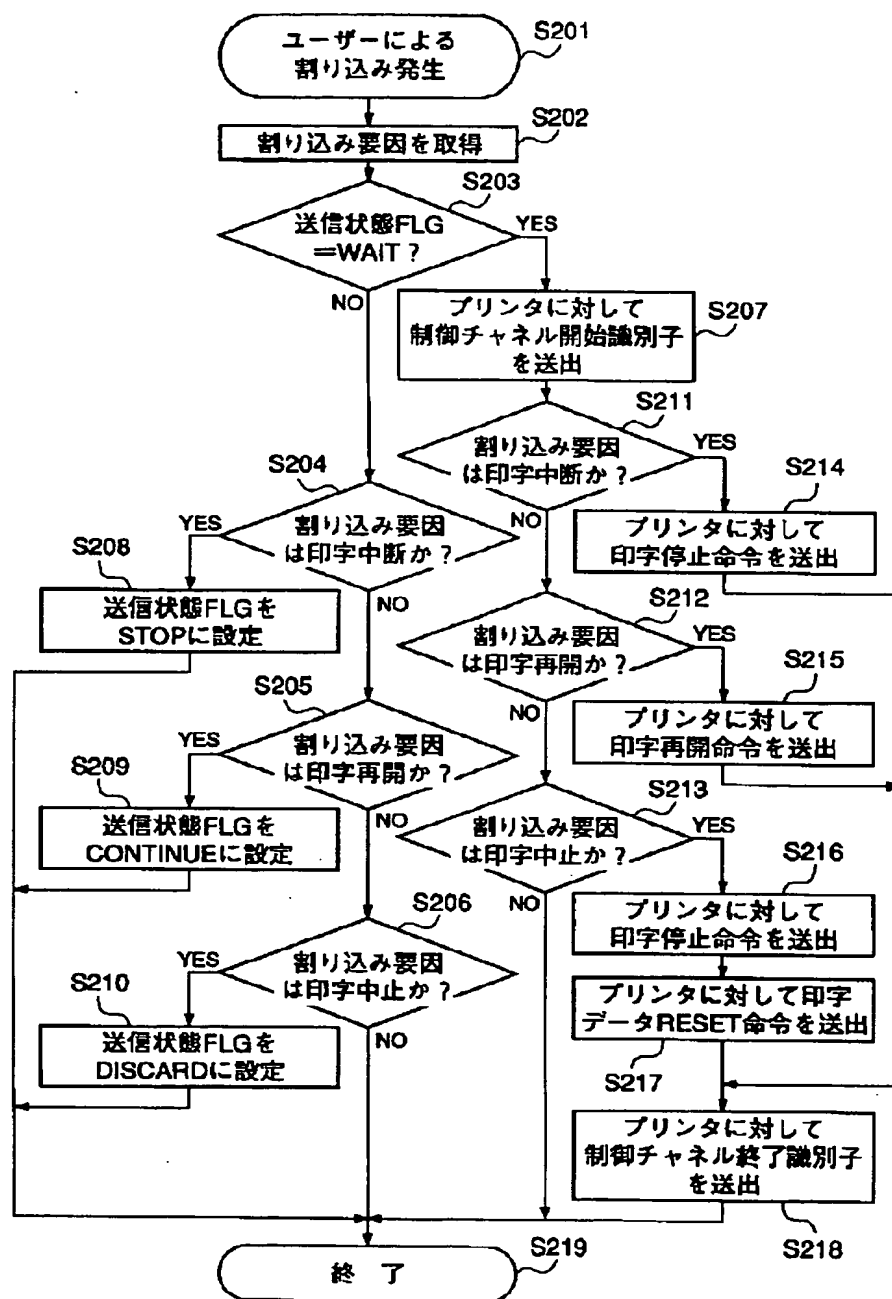
【図16】



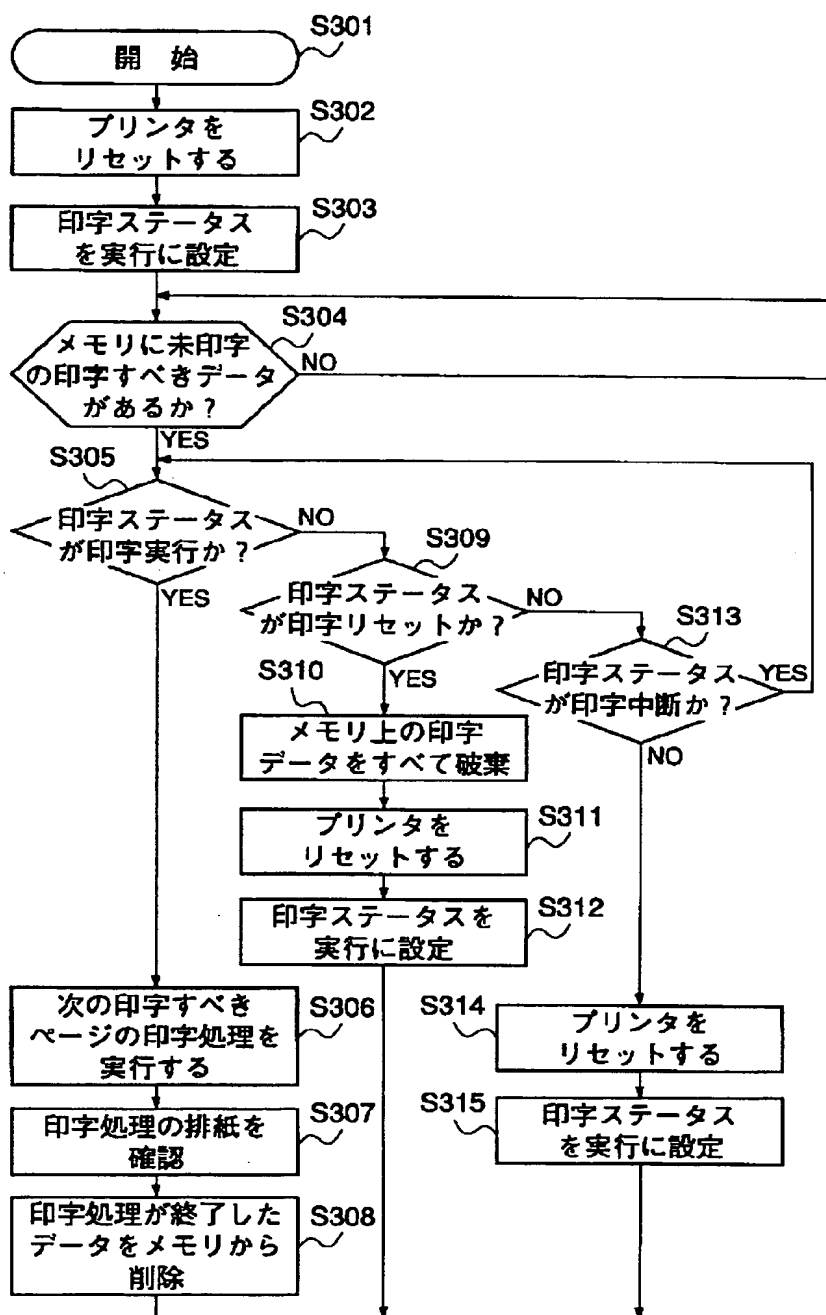
【図5】



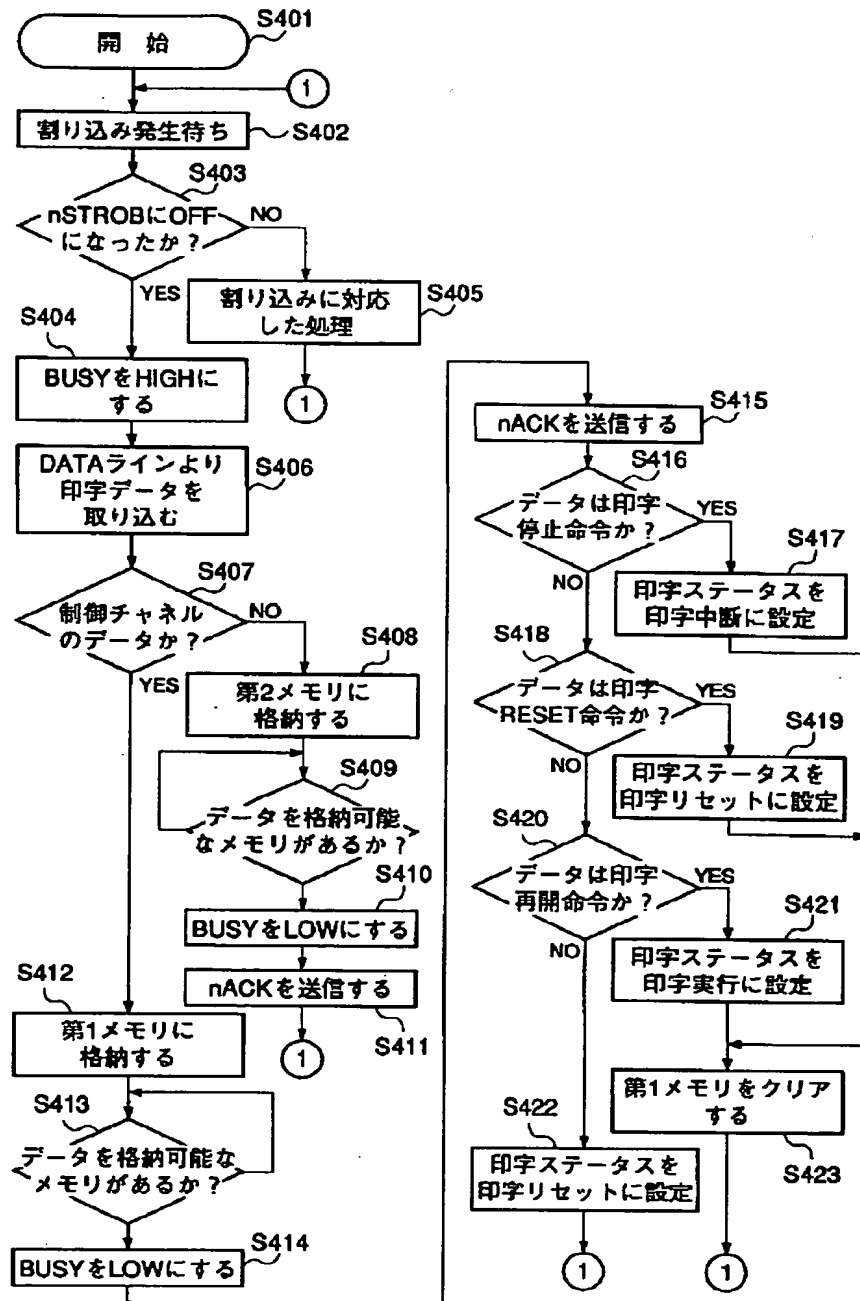
【図6】



【図7】



【図8】



【図9】

セントロニクス線 プリンターベンダーに開放されている
コントロールバイトの利用

例1

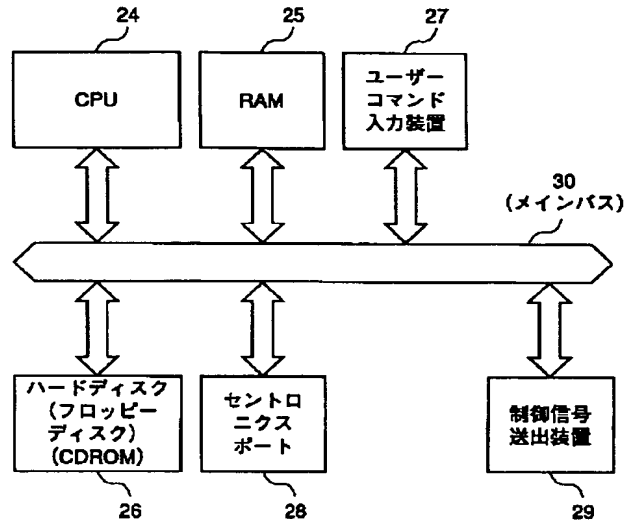
命令	BIT番号	5	6	7
印刷中断命令	ON	-	-	-
印刷再開命令	-	ON	-	-
印刷中止命令	-	-	-	ON

例2

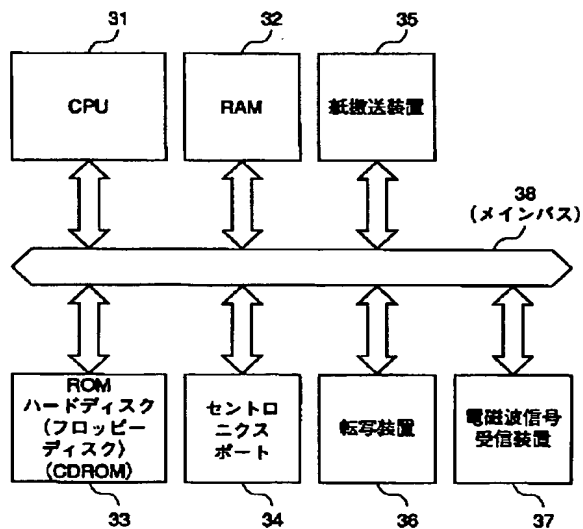
命令	BIT番号	5	6	7
印刷中断命令	OFF	-	-	-
印刷再開命令	ON	-	-	-
印刷中止命令	-	ON	-	-

(..... DONT CARE)

【図10】

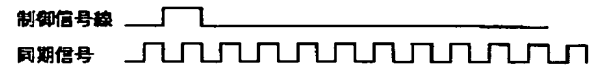


【図11】

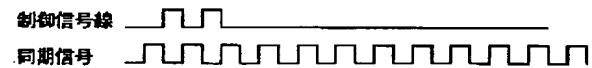


【図13】

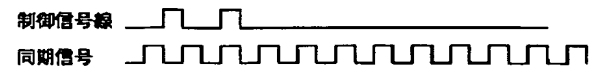
1 印字停止命令



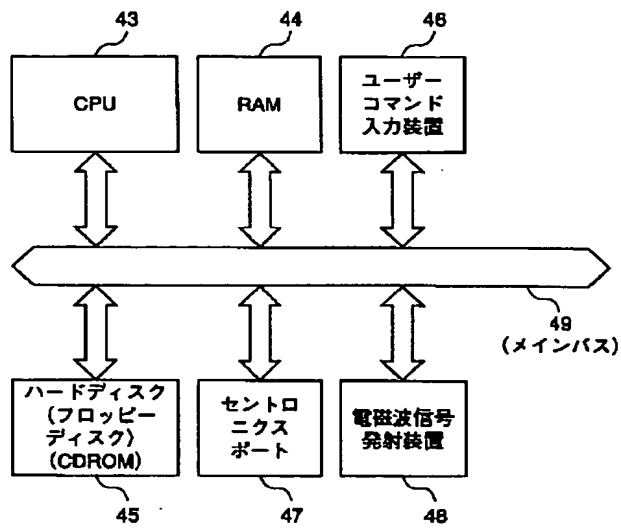
2 印字再開命令



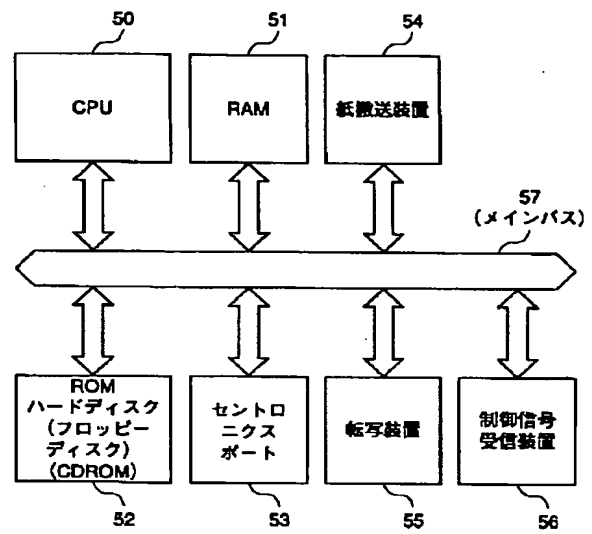
3 印字データRESET命令



【図14】



【図15】



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